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Heating Piping & Air Conditioning

DESIGN
INSTALLATION
OPERATION
MAINTENANCE

DECEMBER ★ 1946

INDUSTRIAL
COMMERCIAL
INSTITUTIONAL AND
PUBLIC BUILDINGS

115—Journal Section of the American Society of Heating and Ventilating Engineers

Preview of

THE INTERNATIONAL HEATING, VENTILATING AND AIR CONDITIONING EXPOSITION — Cleveland, January 27-31

The Annual Meeting of the American Society of Heating and Ventilating Engineers

The Annual Convention of the National Warm Air Heating and Air Conditioning Association

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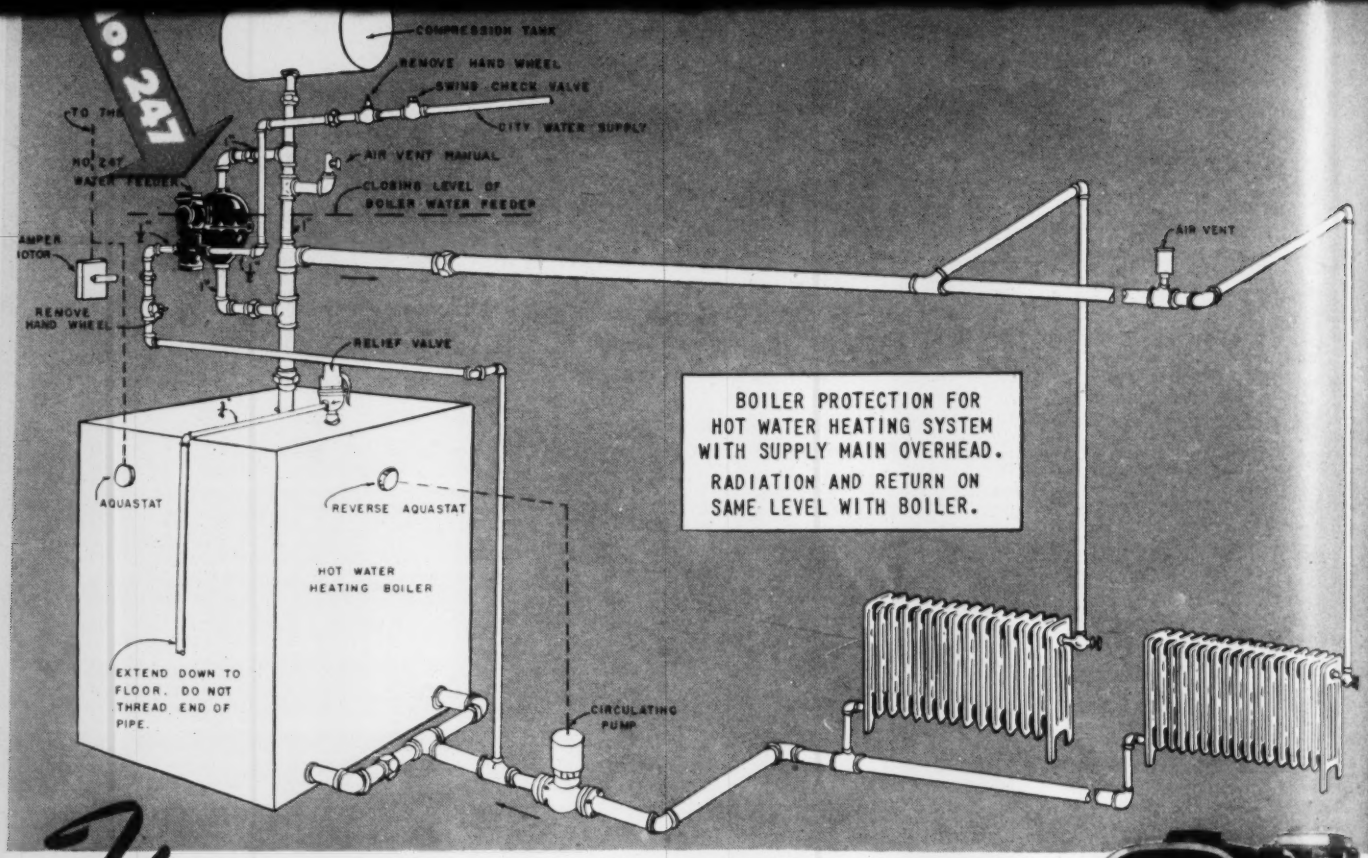
See the special "Show Section" in this issue for complete information on the big week in Cleveland


COMPRESSION TANK
REMOVE HAND WHEEL
SWING CHECK VALVE
CITY WATER SUPPLY
AIR VENT MANUAL
CLOSING LEVEL OF BOILER WATER FEEDER
AIR VENT
RELIEF VALVE
AQUASTAT
REVERSE AQUASTAT
HOT WATER HEATING BOILER
EXTEND DOWN TO FLOOR. DO NOT THREAD END OF PIPE.
CIRCULATING PUMP
BOILER PROTECTION FOR HOT WATER HEATING SYSTEM WITH SUPPLY MAIN OVERHEAD. RADIATION AND RETURN ON SAME LEVEL WITH BOILER.

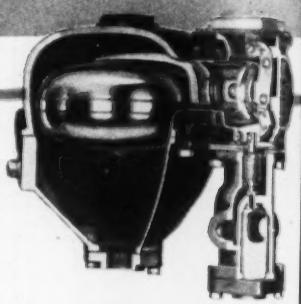
Yes, boiler water feeders on hot water heating systems!

• Some old timers may shrug their shoulders a little at the sight of water feeders on hot water heating boilers. The fact remains, however, that there will be more and more of them. They are being written into many hot water specifications; recommended for certain types of hot water systems by leading consulting engineers.

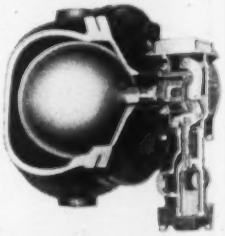
A typical application of a float operated boiler water feeder on a hot water system now being widely used is shown in the schematic drawing above—a forced circulation system with radiation on the same level as the boiler. We first ran into this need for a float operated boiler water feeder while studying the application of our Btu. rated safety relief valves. In army camps and housing projects where this and similar systems were used during the war, it was found that merely holding down pressure by means of an adequate relief valve could not, under certain conditions, prevent damage and boiler losses.

As a result, we were granted permission to conduct a series of experiments on systems of this type at Camp Carson, Colorado. In the course of this work it was found that the trouble could be corrected by installing a float operated boiler water feeder as shown in the drawing to keep the system filled to its highest point. And so conclusive were the results that the hook-up became standard under "Corps of Engineers Specification CE-51 Forced Hot Water Heating Systems," for systems of this kind. Many float operated feeders have since been installed on these "same-level" systems and *there is no case on record of any trouble with plants so equipped.*

In applying float operated boiler water feeders to hot water systems it has also been found that in addition to the protection of the boiler, a number of gains are made in the efficiency and dependability of operation of the system. The story is too involved to be told in limited space, but many eye-opening and helpful facts are available to those interested in this rapidly broadening field.



McDonnell No. 247 boiler water feeder used on type of hot water system shown above. It is the same as the McDonnell No. 47 except that it is for installation with equalizing piping. It is also available with low water cut-off switch (as No. 247-2) for automatically fired hot water boilers.



McDonnell No. 51 boiler water feeder for the larger boilers. This type of feeder is also available with low water cut-off switch (as No. 51-2) for automatically fired hot water boilers.

No. 150 low water control for boilers of any size with pressures up to 150 lbs. The No. 150 may be used as low water cut-off; low water alarm, or as a combination of these functions.

McDONNELL & MILLER, INC., 1316 Wrigley Bldg., Chicago 11, Ill.

Your Jobber Stocks Them

Doing One Thing Well

McDONNELL *Boiler Water Level* **CONTROLS**

THE EDITOR'S PAGES

"SHOW SECTION" IN THIS ISSUE

Complete, convenient information on the International Heating, Ventilating, and Air Conditioning Exposition, the annual meeting of the American Society of Heating and Ventilating Engineers, and the annual convention of the National Warm Air Heating and Air Conditioning Association is given in the special "show section" published in HPAC this month.

These three big industry affairs are scheduled for January 27-31 at Cleveland. Thousands will attend the exposition—at which some 300 manufacturers will exhibit—and these important meetings.

The "show section" will be of equal interest—perhaps of more interest—to those who do not plan to be in Cleveland the last week of next month, for it gives a complete listing of the products to be displayed by the exhibitors. If you won't be able to see the displays themselves, don't fail to check over this listing to be fully informed on available equipment.

SEES MORE ELABORATE AIR CONDITIONING

With air conditioning becoming more commonplace every year in all sorts of buildings, people are naturally becoming more critical of the results obtained. Years ago, when air conditioning was more of a novelty, it was perhaps enough just to be cool on a hot summer day, but now conditions that are "ideal" are demanded by those for whom comfort air conditioning is installed—the occupants.

This means more elaborate—rather than simpler—air conditioning installations, according to William Goodman, consulting engineer, professor of mechanical engineering at Illinois Institute of Technology, and a member of HPAC's board of consulting and contributing editors, in a talk last month before the fire protection and safety engineering section of the Western Society of Engineers.

Mr. Goodman stressed the differences in designing air conditioning systems for multi-room buildings—such as hotels, offices, apartments, etc.—as compared to theater and restaurant jobs, for example. The multi-room structure is characterized by largely varying sensible heat loads with the moisture (or latent heat) load practically constant. In the design for the Bismarck hotel installation, Chicago, for which he is the consulting engineer, this problem is met by using a primary air system, with the primary air fan and equipment in a penthouse serving secondary air systems on 15 floors through a large vertical duct.

Particular attention was given in the design to fire and smoke hazards of the air conditioning equipment, and it is planned to use photo-electric cells with the beam across the air duct entering each fan room to stop the fan system on that floor if there is smoke in the duct. The interrupted beam will also ring a warning bell in the engineer's room and an annunciator will indicate which fan system has been shut down. The idea is "to get something done about the trouble before the guests are aware of any trouble." Pushbuttons at the clerks' desks, the hotel switchboard, and in the engineer's office can stop all fan systems in the building.

Door switches will be installed on the fan room doors to short the photo-electric cells out of service when they must be opened for maintenance or inspection.

URGES RETURN OF REFRIGERANT CYLINDERS

Short supplies of the refrigerant "Freon-12" can be alleviated by the prompt return of empty steel shipping cylinders, says the Refrigeration Equipment Manufacturers Association. The association urges all users of refrigeration and air conditioning equipment to return the cylinders to the refrigerant manufacturer and to disregard reports of continued shortages which have caused some users to accumulate excessive stocks.

At the same time, the association called upon railroads and trucking lines to give greater consideration to hauling empty cylinders, pointing out that the recent truck strike in New York and other tieups have caused cylinders to pile up and to cause production slowdowns. Full cooperation in returning empty cylinders will boost shipments not only of full cylinders but of all types of completed refrigeration and air conditioning equipment, the REMA declared.

WE QUOTE . . .

"The construction industry is highly complex. The men and organizations which normally work on large construction projects are an entirely different group from those which normally build houses. It is true that there is some degree of interchangeability of manpower, equipment, and materials, but only to a minor extent. What little is gained to housing by enforcing a ban upon nonresidential construction is more than offset by the harm done to the economic welfare of the country as a whole.

"Veterans need homes, it is true, but they also need jobs. Recent studies have shown that it requires an average investment of about $6000 in buildings, machinery, and equipment to provide working facilities for each worker. This money must be expended *before* the worker can be hired. Because commercial and industrial expansion are frequently on a large scale, it may require many months of construction to provide the necessary facilities. The national chamber has already received a number of requests for advice and aid in getting authorizations for nonresidential construction from communities where the shortage of working space for veterans is more acute than the shortage of homes for veterans. If the present freeze on commercial and industrial construction is continued much longer, these cases will begin to snowball. The restrictions of 1946 will show up in the unemployment figures of 1947 and 1948."—*from a statement by George W. West, chairman of the construction and civic development department committee of the Chamber of Commerce of the United States before a special committee on housing of the American Legion on November 5.*

SPECIAL BULLETIN TO ALL HPAC'S READERS:

Best wishes for a Merry Christmas and a Happy New Year!

THE EDITOR'S PAGES

VALUABLE FEATURE COMING NEXT MONTH!

The 1947 Directory Section of Heating, Piping, and Air Conditioning Equipment for Industrial, Commercial, Institutional, and Public Buildings will be published in the January issue of HPAC. As in previous years, this feature of the January number will classify all products used in Part 1, will give all trade names not the same as or indentifiable from the manufacturer's name in Part 2, and will show the complete street addresses of all manufacturers listed in Part 3.

This valuable directory of equipment is brought up-to-date each year, with the cooperation of the manufacturers in the heating, piping, and air conditioning field and thorough checking by the publication staff. Complete and authoritative, it is a "tool" that we know you will find very handy during the coming year.

AIR CONDITIONING MUST BE PLANNED FOR BEST RESULTS

"Air conditioning gives the greatest satisfaction when it is planned to fit your special needs," the Electrical Association of Philadelphia stresses in a recently-issued circular listing the names and addresses of the member firms of the association's air conditioning and industrial refrigeration group.

Addressing prospective buyers of air conditioning, the association says that the ideal indoor weather that planned air conditioning gives is even better than Nature. Planning is essential, however, because "every installation is different." Space, construction, and design are all factors that make any installation a special problem requiring special consideration.

Planning beats guesswork, for when the needs of a job are scientifically analyzed, the right air conditioning to meet the needs can be properly applied; this will assure accurately controlled temperatures, with a "regular humidity" best suited to the job, says the association.

Such planning takes an expert, it is pointed out, for air conditioning is an exacting science, and careful study of the particular case will give far greater assurance of satisfaction than will haphazard selection and installation by untrained personnel.

BUILDING PRODUCTS INSTITUTE FORMED

Representatives of 200 companies and associations engaged in the manufacture of building materials and equipment have formed a new fact-finding and economic research organization to be known as the Building Products Institute, with offices at 1756 K St., N. W., Washington 6, D. C.

Douglas Whitlock, formerly chairman of the advisory board of the Producers' Council, was elected chairman of the group. "The purpose of the institute," Mr. Whitlock said, "is to assemble, analyze, and disseminate facts about the production of building materials and equipment and about the progress of construction, including housing.

"The institute also will analyze and make recommendations with respect to proposed legislation affecting the construction industry and will cooperate with other branches of the industry in preparing recommendations designed to stimulate a maximum volume of construction, to lower the cost of building, and to stabilize construction activity."

STANDARD FOR IRON BODY VALVES

The standing committee in charge of reviewing and revising simplified practice recommendation R184-42, iron body valves, has approved a revision of the recommendation, and the Division of Simplified Practice, National Bureau of Standards, Washington 25, D. C., has mailed copies for approval or comment or both.

The proposed revision applies to the usual types of iron gate, globe, angle, and check valves for primary pressures of 25, 125, 150 and 250 lb, and 100 and 800 lb pressures for water, oil, and gas. A simplified range of sizes is given for the various types and kinds of valves for each of the pressure ratings.

CENTRIFUGAL PUMP FUNDAMENTALS

In connection with any proposed increase in the speed of a given pump, it must be borne in mind that the pressure developed (head), and also the centrifugal force within the impeller tending to burst it, increase *very rapidly* as the speed is increased and care must be taken not to raise the speed to such a point that the resulting pressure exceeds that for which the casing was designed, or that the resulting internal strains in the impeller will exceed the "safe working" values. The pump manufacturer, only, has the necessary data available and should be consulted *before any change is made*, and his recommendations should be followed implicitly. —JOHN J. WOOLFENDEN, Smith, Hinchman & Grylls, Inc., Architects & Engineers.

HEADS INTERNATIONAL STANDARDS BODY

Howard Coonley, chairman of the executive committee of the American Standards Association has been elected president of the new International Organization for Standardization, the formation of which was recently completed by delegates from 25 nations meeting in London.

GEORGE P. TORRENCE NAMED PRESIDENT

George P. Torrence, executive vice president of Link-Belt Co. since July 1946, became president of the company last month, succeeding William C. Carter.

Mr. Carter, who had been president since December 1942, has retired from this position in accordance with the company's retirement plan. He continues as a director of the company and as chairman of the executive committee of the board.

HPAC INDEX FOR 1946 READY SOON

An index to Heating, Piping & Air Conditioning for the year 1946 will be ready soon after the first of the year. If you want a copy, send a postcard to The Editor, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2, Ill. There is no charge to subscribers. Your request will be held without acknowledgment until your copy of the index is mailed to you.

Heating Piping & Air Conditioning

with which is merged the Aerologist

Design, Installation,
Operation, and Maintenance:
Industrial, Commercial, Institutional,
and Public Buildings

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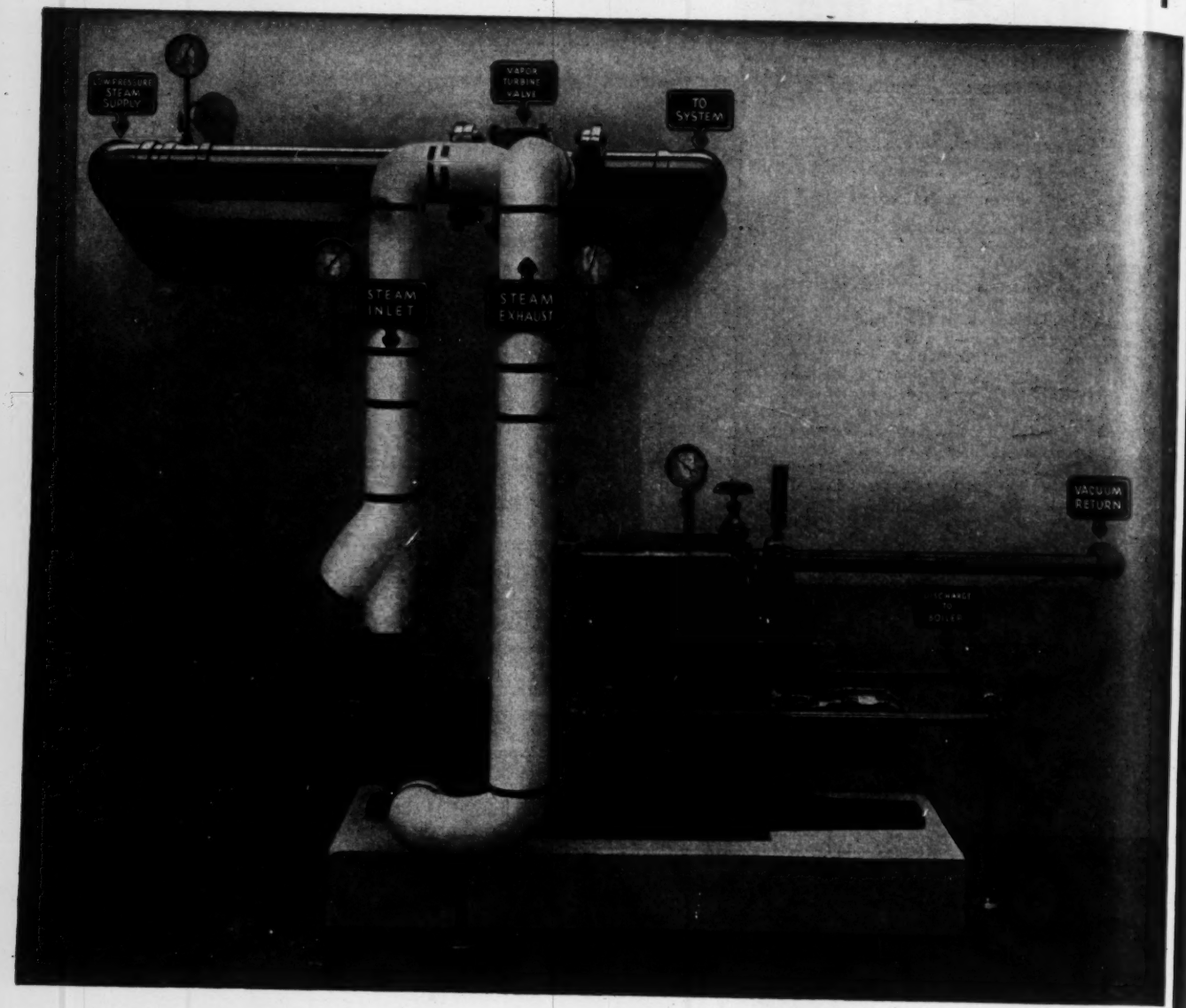
Interrupted Electric Service will not stop this NASH Heating Pump



In Hospitals, Greenhouses, Schools, Public Buildings, Theatres, wherever heating systems must not fail, install the Nash Vapor Turbine, for it is independent of electric current failure, and continues to operate as long as there is steam in the system.

This is because the prime motive power of this economical pump is a special steam turbine, controlled by a unique "Vapor Turbine Valve", which automatically bypasses from the heating main a small portion of steam, the exact amount necessary to develop the power needed to remove the condensate and maintain the required vacuum on the system. Even this small amount is passed immediately back to the mains, and goes on to the system with little heat loss. This pump operates on any system, high or low pressure.

The Vapor Turbine is a most economical pump, for the elimination of electric current does away with current cost, the largest single item in the operation of an ordinary return line heating pump. Bulletin on request.

THE NASH ENGINEERING COMPANY

205-A WILSON ROAD, SOUTH NORWALK, CONNECTICUT, U. S. A.

"How" and "Why" of PREVENTIVE MAINTENANCE

M. B. Goddard Tells How to Inspect and Service Air Conditioning Jobs to Assure Efficient Operation and to Prevent Breakdown Interruption

PREVENTIVE MAINTENANCE probably needs no definition—but to avoid misunderstanding, let it be described as that form of inspection and service work which is intended to assure efficient operation of equipment without interruption due to major breakdowns. The word "intended" is used advisedly, as not even the most optimistic would expect that mechanical failures can be entirely prevented. Often, however, they can be foreseen and anticipated or obvious causes of failure can be detected and removed.

Preventive maintenance is common in many fields and in some is required by law. Elevator inspection and service is an example and it must be agreed that by careful attention the number of mechanical failures of elevators is kept to a low percentage. Another example is the operation and care of high pressure steam boilers, in which make up water is treated, they are blown down and cleaned regularly, and they are carefully inspected at suitable intervals so that weaknesses such as pitted tubes, snapped rivets, etc., can be repaired or replaced. Such maintenance is required in these cases to eliminate a definite hazard to life or property.

There is another common example of preventive maintenance—the care given to automobiles by having them greased, oiled, tires and battery checked, and other recommended services performed at regular intervals. In this case, the main motive is economy since experience has shown that their omission is almost certain to lead to expensive overhauling and replacements.

It is certainly logical that the same reasoning can be applied to refrigerating and air conditioning systems. One would be considered foolish if he drove a new car away from the sales floor and just ran it without giving it any attention at all until something broke. Why, then, should an owner of an expensive refrigerating plant let it run without attention until

Fig. 1—A service contract for air conditioning

.....

.....

.....

Gentlemen:

Kindly provide us with a Service Engineer to inspect our Air Conditioning system, installed at the above address. The Service Engineer will inspect the apparatus and the condition of its operation at the intervals noted below.

After each inspection, you will submit to us a written report of the condition of the apparatus, recommendations for improvements thereof, and a list of the necessary repairs and repair parts, and an itemized estimate of the material costs and approximate labor costs. No repairs or improvements will be undertaken without our written authority; provided, however, that emergency calls and emergency repairs that may be necessary may be authorized by our ..... and you will, in such cases, accept the authorization; provided further that replacing the normal loss of refrigerant found necessary on periodic inspection need not be authorized.

The Service Engineer's work will include the following:

1. Making a ..... monthly inspection for the months of ..... to ..... inclusive for the cooling season and for the months of ..... to ..... inclusive for the heating season.
   - (a) Necessary adjustments.
   - (b) Oiling or greasing all bearings, including motor, fan and damper bearings, including furnishing oil or grease.
   - (c) Inspecting for leaks that may have occurred on equipment or piping.
   - (d) Inspecting and cleaning all controls and contact points.
   - (e) Cleaning spray nozzles on units so equipped.
   - (f) Checking expansion valve adjustments.
   - (g) If water condensers, setting water valves for best operating economy according to seasonal water temperature variations.
   - (h) Cleaning all drain screens and flushing sludge out of pans.
   - (i) Inspecting filters.
   - (j) If service during heating season is included, inspecting steam valves, controls, damper settings, etc.
   - (k) Instruct the person or persons responsible for the operation of the equipment and inform them of any changes or adjustments.

   We agree to pay you as compensation for such services, the sum of ..... DOLLARS ($.....) per month, for the cooling season, and ..... DOLLARS ($.....) per month for the heating season.

2. In order better to protect our equipment, we request the following additional service at the appropriate period.
   - (a) At a time designated by us, shut down the cooling system at the end of the cooling season and prepare it for the winter for the sum of ..... DOLLARS ($.....) additional.
   - (b) Also, at a time to be designated by us, at the beginning of the cooling season, to prepare the system for the cooling operation, starting it up and reinstructing our personnel in its operation for the additional sum of ..... DOLLARS ($.....).

3. No costs of repair work, repair parts or refrigerant are included herein. If any such repair work, repair parts or refrigerant are required by us, we will give you, as stated above, a separate order therefor at the following rates.
   - (a) Repair or replacement parts shall be charged at Carrier list prices, less ..... Freight, cartage of material and taxes shall be charged at cost. Refrigerant and other than Carrier material shall be charged at cost, plus 25%.
   - (b) Rates of engineers for repairs shall be at ..... DOLLARS ($.....) per hour, which rate includes insurance and taxes. Time of traveling to and from the job shall be paid at the same rate per hour.
   - (c) Traveling expenses, if any, of engineers shall be added at cost.

4. Emergency calls occurring between periodic inspections shall be charged at the rates outlined in No. 3 above.

For our convenience and to make it possible for us to have authoritative, exclusive direction and control of the service engineer we mutually agree that although he *is in* your general employment, nevertheless, he shall be considered as our special employee and agent while on our premises. Also, as a convenience to us, you will advance his expenses and wages, but this act will not be deemed to change the special employment of the service engineer by us and no claim or right to the contrary shall be asserted.

No person has authority to make or claim any representation, warranty term, promise or condition express or implied, statutory or otherwise, which is not expressed herein.

Invoices shall be rendered monthly, and shall be due and payable at your office, ... ten days after date of invoice.

This order may be terminated by either party hereto upon thirty days written notice to that effect.

Very truly,

Accepted in Triplicate

Place .....

Date .....

..... Owner of Equipment

..... By: .....

By: .....

something gives way? Yet many owners do just that, with the result that they are confronted not only with expensive repairs but also with interruption of service—frequently at a time when it is most needed.

It is not known what percentage of owners are employing preventive maintenance, but a rough check in one large city has indicated that it is probably less than 10 per cent. It is doubtful if this low percentage is due to any question as to the value of the service, for among those who do avail themselves of it will be found the larger users, such as the chain stores—some of whom may own well over 100 plants. Concerns of that kind generally keep elaborate cost records and know definitely the value of such maintenance; when they can be found almost universally in favor of it, then all doubts as to its desirability should be removed.

Value of Outside Inspection and Maintenance

It might be supposed that in the case of the larger chain store units that employ an operating engineer to maintain and operate the equipment, inspection or maintenance by outside agencies would be dispensed with but usually this is not so. The owners appear to be particularly interested in such service on these larger jobs as it keeps their own men on their toes, and at the same time it provides them with a check on their work. It is only natural that an operating engineer will try to keep his plant cleaned up and in good shape if he knows that contrary conditions may be noted in reports going in to his supervisors.

As an illustration of this advantage I recall a case where the store manager kept the operating engineer so busy moving fixtures and taking care of odd jobs in the sales space that he was unable to maintain the air conditioning equipment properly. As a result, the spray nozzles became clogged and when the service engineer called on an inspection trip, he found it advisable to obtain an order for cleaning them himself. The bill the store manager received for this work was of course rather large, and shocked him into a realization that it might be better to allow his own engi-

Fig. 2—Serviceman's check list for a centrifugal refrigeration machine

JOB NAME
ADDRESS

MACHINE SIZE _____ SERIAL # _____

DATE INSPECTED:
INSPECTED BY:
MONTHLY INSPECTION:
START-UP REFRIG.:
SHUT-DOWN REFRIG:

	COMPRESSOR	MONTHLY	START UP	SHUT DOWN
1	Adjust & Record Pump Chamber Oil Level	■	■	■
2	Adjust & Record Atmos. Float Chamber Oil Level	■	■	■
3	Adjust & Record Vacuum Float Chamber Oil Level (CZ only)	■	■	■
4	Adjust & Record Seal Pressure Chamber Oil Level	■	■	■
5	Adjust & Record Oil Pressure before Seal	■	■	■
6	Adjust & Record Oil Pressure after Seal	■	■	■
7	Check Seal (Rate of Oil Loss)	■	■	■
8	Adjust & Record Bearing Temperature, Front (adjust)	■	■	■
9	Adjust & Record Bearing Temperature, Rear (adjust)	■	■	■
10	Drain Water from Oil Cooler			■
11	Drain Water from Seal Jacket			■
	COOLER			
12	Record Refrigerant Level (running)	■	■	■
1	Record Water Circuit Pressure Drop	■	■	■
14	Record Pressure of Refrigerant	■	■	
15	Record Temperature of Refrigerant	■	■	
16	Record Difference between Refrig. Temp. & Outlet Water	■	■	
17	Drain Water			■
	CONDENSER			
18	Record Water Circuit Pressure Drop	■	■	■
19	Record Difference between out-going Water and Condensing Temperature	■	■	
20	Record Pressure of Refrigerant	■	■	
21	Drain Water			■
22	Inspect Tubes			■
	DRIVE			
23	Record Gear Box Oil Pressure	■	■	
24	Record Gear Box Oil Level	■	■	
25	Adjust Gear Box Temperature	■	■	
26	Check Oil Level Motor Bearing (front)	■	■	
27	Check Oil Level Motor Bearing (rear)	■	■	
28	Inspect & Record Condition Motor Brushes & Rings	■	■	■
29	Check Oil Level in Couplings	■	■	
30	Check Alignment of Couplings		■	
31	Drain Water			■
	EVACUATOR			
32	Record Refrigerant Level in Refrigerant Chamber	■		■
33	Drain & Record Water Removed from Water Chamber	■		■
34	Check Condition Drier Material		■	
35	Record Pressure	■	■	■

	RECOVERY SYSTEM	MONTHLY	START UP	SHUT DOWN
36	Record Oil Level in Compressor	■	■	■
37	Record Oil Level in Receiver (drain if necessary)	■	■	■
38	Record Refrigerant Level in Condenser (drain if necessary)	■	■	
39	Record & Adjust Pressurestat (CZ type)	■	■	
40	Examine Discharge & Suction Valves	■	■	
41	Record & Adjust Suction Pressure (M type)	■	■	
42	Oil Motor Bearings (M type)	■	■	
43	Drain Water from Condenser			■
	LIQUOR PUMP (type CZ)			
44	Adjust Shaft Packing	■	■	
45	Oil Motor Bearings	■	■	
	CONTROLS			
46	Inspect & Record Condition Starter	■		■
47	Check Operation Differential Flow Control	■	■	■
48	Check Setting Single Duty Regulator	■	■	■
	WELL WATER PUMP (when installed)			
49	Check & Adjust Packing	■	■	
50	Check Alignment	■	■	
51	Oil Motor	■	■	■
	MISCELLANEOUS			
52	Spare Parts (condition & adequacy)	■	■	■
53	Tools (condition & adequacy)	■	■	■
54	Refrigerant (amount in stock)	■	■	
55	Refrigerant (added)	■	■	
56	Oil (added)	■	■	
	OTHER EQUIPMENT INSPECTED			

REMARKS and RECOMMENDATIONS:

NOTE: ■ Indicates when operation necessary

neer to devote more time to his own work.

Another advantage to such users is that if there is a change made in operating personnel, the service engineer can correct errors in operation that may result from the new man's unfamiliarity with the equipment.

We thus find that those users of air conditioning and refrigeration who are in the best position to determine the advantages of preventive maintenance are strongly in favor of it, and there need be no hesitation in recommending it as an economical proposition to other users.

Service or Inspection Contract

A common form of preventive maintenance work is that which is done under what is known as a service or inspection contract. Work under such a contract is (in the case of air conditioning jobs) usually divided into three parts—spring startup, monthly or other periodic inspection, and fall shutdown. In the case of year 'round air conditioning systems the inspections are continued through the heating season. For commercial refrigeration jobs, the startup and shutdown operations are of course eliminated.

In general, such contracts cover certain definite minor service operations to be performed at each visit, such as checking for leaks, oiling and greasing, adjusting belts, checking refrigerant charge, etc. Should this inspection show a necessity for major repair work, the matter is called to the owner's attention and authority to proceed is obtained, the owner being billed for this additional work at regular rates.

Fig. 1 illustrates a typical inspection or service contract. It provides for a written report of the condition of the equipment, recommendations, list of necessary repairs and parts, and the cost. It also states that repairs will not be undertaken without authorization; this wording has been carefully chosen to avoid any impression that repair work is included in the contract. However, the form does go on to list 11 general types of operation that will be taken care of during each inspection. One, I believe, should be omitted—cleaning spray nozzles. In many cases such cleaning amounts to major repair work, although inspection of the spray nozzles should probably be included in the form.

The balance of the contract concerns charges, rates, terms of payment, etc.

Check Lists Show Work Done

The provision that a written report is to be furnished the owner might seem unwise, as there isn't much time to sit down and dictate reports. However, this is easily taken care of by the use of a check list such as the one shown on p. 78. The various possible components of the system—compressors, condensers, etc.—are listed separately, and under them are shown the operations to be performed. It will be noted that the heavy black squares—by their location under columns headed monthly, shutdown and startup — indicate when the designated operations are to be performed. If such forms are made up in pads, it is easy to fill out an original and duplicate, checking off each operation as it is performed, making suitable notes beside the various items, and filling in remarks and recommendations at the bottom. The duplicate can then be given to the owner or his representative and constitutes the written report. Thus, each party has a permanent record of the inspection.

PREVENTIVE MAINTENANCE is defined by Mr. Goddard, of the Carrier Corp., as "that form of inspection and service work which is intended to assure efficient operation of equipment without interruption due to major breakdowns." In this discussion (from a paper given before a recent meeting of the Refrigeration Service Engineers Society) he explains the value of such maintenance, presents a typical inspection or service contract, and shows check lists of the various maintenance and service jobs that should be done.

On page 77 is a check list covering a summer-winter installation; it differs from the list on page 78 mainly in the time for performing the various operations.

Fig. 2 is a check list used for the inspection of a centrifugal compressor. It is presented mainly to show how the general principle involved can be adapted to the requirements of special types of installations.

Fig. 3 is a check list for a commercial refrigeration job. Since this type of job operates all year, there are no shutdown or startup operations involved, and all appropriate operations are performed at each inspection.

These check lists are also convenient to use as estimating forms in determining the proper charge for an inspection contract. The estimator can write, in the blank space adjacent to each operation, the time in minutes that will be required to perform that operation, and can thus arrive at the total time involved. This estimate sheet can then be filed in the job file for future reference.

Recording Operating Data

It may be found desirable to record on the check list operating data such as pressures or temperatures, so that by comparison any serious deviation from normal can be observed. Such records would not be very significant on an ordinary air conditioning job, because there are so many variables influencing the performance of the equipment that the determination and recording of all of them would be an impractical task. However, on a commercial refrigeration job, conditions are relatively stable and such records may be of real value.

Records of this sort have been found extremely helpful on such jobs as centrifugal compressor installations. A centrifugal for this type of installation is practically a large self-contained water chiller, and is usually equipped with enough instruments so that all operating data denoting performance can be readily determined. It is common practice on inspection of such jobs, therefore, to record these data on a special log sheet, which is sent in to headquarters.

A typical log sheet is illustrated in Fig. 4. Upon receipt of such a log sheet at headquarters, an engineer can, by referring to performance curves, detect any deviation from normal performance and diagnose such conditions as dirty condenser tubes, noncondensable gases, etc. For example, in one case the data on such a log sheet enabled an engineer to determine that the centrifugal compressor on a job a thousand miles away was not pumping sufficient gas. Instructions were wired to the service engineer, who opened up the compressor and found the impellers

JOB NAME: _____
ADDRESS: _____
CUSTOMER: _____
ADDRESS: _____
CARRIER DEALER: _____
ADDRESS: _____

DATE INSPECTED: _____
INSPECTED BY: _____
MONTHLY INSPECTION: _____
QUARTERLY INSPECTION: _____

	COMPRESSOR OPERATIONS	CHECK *
1.	Oil Motor Bearings	
2.	Adjust Drive Belts	
3.	Check Oil Level	
4.	Check and Adjust Head Pressure	
5.	Check Suction Pressure	
6.	Adjust Pressurestat Settings	
7.	Check Rotation	
8.	Check Head Bolts	
	AIR COOLED CONDENSER	
9.	Clean of Dirt and Lint	
	WATER COOLED CONDENSER OPERATIONS	
10.	Check Water Regulating Valve for Economical Operation	
	EVAPORATIVE CONDENSER OPERATIONS	
11.	Oil or Grease Motor Bearings	
12.	Grease Fan Bearings - 9Q	
13.	Grease Pump Bearings - 9Q	
14.	Check Drive Belts - 9Q	
15.	Check Rotation of Fans	
16.	Check Condition of Coils (Scale)	
17.	Check Spray Nozzles, Clean if Necessary - 9Q (Drain Water Piping in Winter)	
18.	Clean Drip Pan and Drain	
19.	Clean Pump Strainer - 9Q	
20.	Clean Air Intake Screen - 9Q	
21.	Check Float Control - 9Q	
22.	Check Fans for Alignment - 9Q	
23.	Check for Correct Bleeder Flow - 9Q	
24.	Check Water Regulating Valve - 9P	
25.	Check Solenoid Valve - 9P	
26.	Clean Water Strainer - 9P	
27.	Clean Spray Nozzle - 9P	

	COLD DIFFUSERS	CHECK *
28.	Oil or Grease Motor Bearings	
29.	Grease Fan Bearings - 15Q, T	
30.	Grease Pump Bearings - 15T	
31.	Check Drive Bolts - 15Q, T	
32.	Check Fans for Alignment - 15Q, T	
33.	Clean Expansion Valve Drip Pan & Drain - 1400, 1800, 15K	
34.	Clean Drip Pan & Drain - 15Q & Gravity Fin Coil	
35.	Clean Pump Strainer - 15T	
36.	Check Spray Nozzles - Clean If Necessary - 15T	
	CONTROLS & ELECTRICAL EQUIPMENT	
37.	Clean Commutators - D.C. Motors	
38.	Check Expansion Valve Adjustment	
39.	Check Thermostat Setting & Clean Points	
40.	Check Contact Points in Starters. Clean If Necessary	
41.	Adjust Back Pressure of Snap Action Valves	
42.	Check Solenoid Valves	
43.	Check Controls on Water Cooler	
	GENERAL & MISCELLANEOUS.	
44.	Test for Refrigerant	
45.	Test for Leaks	
46.	Check Well Water Pump	
47.	Instruct Store Manager or Operator how to operate equipment and inform him of any changes or adjustments made	
48.		
49.		
50.		
51.		
52.		

NOTE: * Check Operations As Performed.

REMARKS and RECOMMENDATIONS:

Fig.3—Serviceman's check list for a commercial refrigeration installation

clogged with pieces of rags and rope that had accidentally entered the system.

On air conditioning jobs requiring a fall shutdown operation, the alert serviceman will spend considerably more than the bare minimum time required to pump the refrigerant down into the condenser or receiver and close a few valves. At this time, he should strive to determine the condition of all parts or components that might require overhauling, repairing, or replacing. This will enable him to get such work out of the way during the winter months and avoid a great deal of emergency repair work and service interruptions during the next operating period.

Shutting Down in the Fall

While it is hardly necessary to discuss in detail the operations involved in shutting a plant down in the fall, there are probably a few points which are worthy of mention.

Condensers, for example, deserve particular attention at shutdown. Whether they are of the water cooled or evaporative type, they are subject to scaling and it is important to determine whether they should be cleaned or descaled during the winter. If water cooled condensers are subjected to freezing temperatures, they should be drained and additional precautions against freezing should also be taken. The small diameter tubes used in modern condensers are not self-draining due to surface tension of the water in them. One way to remove this water is to blow it out, using a fairly large volume of air, say 50 to 100 cfm at a pressure of 2 to 5 psi.

Another method of preventing freeze-ups is to circulate a noncorrosive and nonvolatile antifreeze solution through the coil or tubes. This will flush out the water, and any liquid remaining will be nonfreezing. The solution must be strong enough to offset the dilution that will result from the residual water in the condenser.

The same procedure may be followed for water coils which are frequently used either for precooling air or as the main cooling surface and which may be subjected to low temperatures during the winter.

Evaporative condensers that are installed outdoors must be thoroughly drained, and in some cases, pumps and strainers should be taken apart to remove all water. It is advisable to disconnect the water makeup line inside the building so that accidental refilling will not occur.

Give System a Good Cleaning

Another important step to be taken either during the fall shutdown or at the spring startup is to give the entire system a good, thorough cleaning. It is only natural that a service engineer would prefer to work on a nice clean system than one that is covered with grease and dirt, and I think there are few owners who would not take pride in a neat, clean looking installation.

However, in too many cases, neither one does anything about it, and the dirt gets thicker and thicker, belts and motors become oil soaked, and the life of the equipment may be definitely imperilled. It should be a part of preventive maintenance to keep things clean.

In many localities, companies can be found that specialize in cleaning. They are often listed as fireproofing contractors and are prepared to send in trained men who can wash off and even repaint compressors, condensers, fans, cooling units, etc. In addition, they can perform an operation which is not very often thought of, but which may work wonders in restoring an air conditioning job to full efficiency: They are prepared to cut necessary access holes into duct systems so that the entire interior can be completely cleaned out with a vacuum cleaner, thus cutting down the air resistance, and at the same time eliminating possible sources of odor.

Another source of loss in efficiency of a system that is often not readily detected is an accumulation of dirt in the air passages of cooling coils. This is especially true in restaurants or similar places where there may be a certain amount of grease vapor in the air. In some cases, coils have been found which had the air passages almost entirely stopped up with dirt, and yet, due to the staggered tube or fin arrangements, this stoppage could not actually be observed and could be determined only by measurements of air flow and pressure loss. Of course, such extreme conditions usually result from ineffective cleaning methods that merely force the dirt back into the air spaces instead of removing it. However, the cleaning contractors are prepared and equipped to vacuum clean or wash down the coils as required and their methods have been found very effective. There is no reason why air conditioning service engineers cannot perform this cleaning service themselves and certainly they should do so if it is not available from other sources in their localities, as it is a very important part of preventive maintenance.

JOB NAME _____ JOB. NO. _____ MACHINE SER. NO. _____ SIZE _____

	COOLER					CONDENSER					COMPRESSOR								PURGE PRESSURE	
TIME	VACUUM	LIQUOR TEMPERATURE	WATER TEMP. IN	WATER TEMP. OUT	CHILLED WATER G P M	VACUUM—IN. OR PRESSURE—LB.	AIR INDICATOR	WATER TEMP. IN	WATER TEMP. OUT	CONDENSING WATER G P M	DAMPER POSITION	CONTROLLER OPERATING POINT	TURBINE R P M	MOTOR R P M GEAR RATIO	BEARING TEMP. THRUST END	BEARING TEMP. SEAL END	OIL PRESSURE BEFORE SEAL	OIL PRESSURE AFTER SEAL	SUCTION	DISCHARGE
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

SAM LEWIS' PAGE

Quick Methods for Checking Radiation

AN ENGINEER writes that he has several large hospitals for which he is designing the heating, and—as he wants to purchase the boilers—he asks for a "really quick method" of making preliminary estimates of the radiation that can be employed without going through the conventional processes of computing the transmission room by room using values that have been established by research.

There is no "shot gun" method sufficiently accurate for an engineer to recommend safely for application in different latitudes and for different characters of building construction.

If there are no complications in the problem, such as for heating large volumes of outside air for ventilating, and if the occupancy is for living quarters, the shot gun method will tell something if the space enclosed by the building, expressed in cubic feet, is divided by 35, the result being a rough figure for square feet of steam radiation.

The Old "2,20,200" Rule

One of the oldest rule of thumb methods of quickly computing the steam radiation to heat a conventional room, and one that continues to strike a fairly correct average, is to divide the square feet of exposed glass by 2, the square feet of exposed wall remaining after deducting the glass by 20, and the cubic feet of contents by 200. The sum of the three quotients will be the square feet of steam radiation. To convert steam radiation to ordinary hot water radiation, divide the steam radiation by 6 and multiply the quotient by 10.

To check these values, let us assume a room 10 ft square and 10 ft high, with one side exposed. In the exposed wall there are two windows each 3 ft wide and 6 ft high. The wall is of 13 in. brick, furred and plastered. Assume that areas above and below and on the three interior sides of the room are heated to the same temperature desired for the room.

By the usual method of computation for interior temperature at 70 F and zero outside, the transmission through glass would be $1.13 \times 70 = 79.1$—say 80 Btu per hr per sq ft. For the wall it would be $0.3 \times 70 = 21$ Btuh per sq ft. Infiltration or leakage for the window crack in a 15 mph wind would be 39.3 cu ft per hr of air per linear foot of crack. To heat 39.3 cu ft of air from 0 to 70 requires $0.018 \times 70 \times 39.3 = 49.5$ Btu.

IN THIS regular feature, informal comment on heating, piping, and air conditioning matters is given by Samuel R. Lewis, consulting mechanical engineer and a member of HPAC's board of consulting and contributing editors. This month he answers a request from a reader who is designing the heating for several hospitals and wants "a really quick method" of making preliminary radiation estimates. Mr. Lewis explains several such methods, but says that none of them is recommended except for the quick checking of overall average quantities.

Then:

Glass, 36 sq ft	× 80	....	2880 Btuh
Net wall, 64 sq ft	× 21	....	1344 Btuh
Crack, 42 linear feet	× 49.5	....	2079 Btuh
			6303 Btuh

One square foot of steam radiation transmits 240 Btuh and thus—figured with reasonable accuracy—the room in question would require 27 sq ft of steam radiation.

By the 2-20-200 shot gun method, the radiation needed would be:

Glass	36	÷ 2	18
Net wall	64	÷ 20	3.2
Contents	1000	÷ 200	5
			26.2

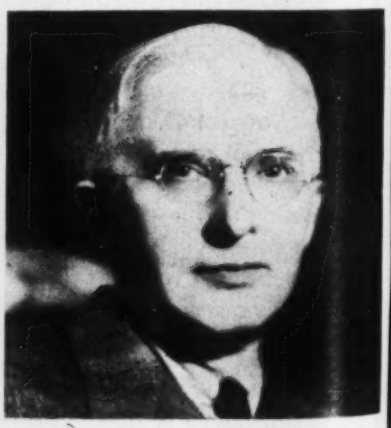
The 1000 cu ft content divided by 35 gives 28.5 sq ft of steam radiation as the answer.

Attempts have been made to approximate the radiation required for an entire building by selecting some factor of the heat-losing area of the building. This scheme does not pan out, as the following example will indicate.

Suppose a building is 100 ft long, 100 ft wide, and 100 ft high. Then the top story loses heat not only around the edges, but also through the roof, but the above-mentioned 35 factor against a content of 1,000,000 cu ft will suggest 28,500 sq ft of steam radiation. The total heat-losing area is 50,000 sq ft. If the building needs 28,500 sq ft of radiation, 1 sq ft of radiation is required for each 1.75 sq ft of exposure area.

Suppose the space to be heated is the small room used in the foregoing example (one side only exposed, 1000 cu ft content, and 100 sq ft of heat-losing area) requiring, as determined by detailed calculation, 27 sq ft of steam radiation. One hundred square feet divided by 1.75 (the shot gun exposure factor that seemed to work on the large building) suggests that the room should be heated by about 57 sq ft of radiation, and the engineer would be in very great trouble if he employed that lazy scheme.

Many engineers are accustomed to vary the allowance for infiltration with reference to orientation and with reference to the prevailing wind. Shot gun methods are not recommended except for quick checking of overall average quantities.



DATA SHEET

MAINTENANCE CHECK LIST

Summer-Winter Installation

JOB NAME: _____

ADDRESS: _____

CUSTOMER: _____

ADDRESS: _____

CARRIER DEALER: _____

ADDRESS: _____

DATE INSPECT: _____

INSPECTED BY: _____

MONTHLY INSPECTION: _____

SUMMER: _____

WINTER: _____

START-UP REFRIG. _____

SHUT-DOWN REFRIG. _____

	COMPRESSORS	Monthly S	Monthly W	Shut Down	Start Up
1.	Oil Motor Bearings	■		■	■
2.	Check Drive Belts	■			
3.	Check Oil Level	■			■
4.	Check Head Pressure	■			■
5.	Check Suction Pressure	■			■
6.	Check Pressurestat Settings				■
7.	Check Rotation				■
8.	Slack Off Belts			■	
9.	Align and Adjust Belts				■
10.	Check Head Bolts	■		■	■
11.	Check Cylinder By-pass Pressurestat Setting				■ ■
12.	Check Oil Pressure	■			■
	WATER COOLED CONDENSERS				
13.	Check Water Regulating Valve for Best Economy	■ ■			■ ■
14.	Drain Condenser			■	
15.	Reconnect Condenser Piping				■
	EVAPORATIVE CONDENSERS				
16.	Oil Motor Bearings	■		■	■
17.	Grease Fan Bearings	■		■	■
18.	Grease Pump Bearings	■		■	■
19.	Check Drive Belts	■			
20.	Slack Off Belts			■	
21.	Check Rotation of Fans				■
22.	Check Condition of Coils (Scale)	■		■	
23.	Check Spray Nozzles. Clean If Necessary	■ ■		■ ■	■ ■
24.	Clean Drip Pan & Drain	■		■	
25.	Clean Water Strainer	■		■	
26.	Clean Pump Strainer	■		■	
27.	Clean Air Intake Screen	■		■	
28.	Check Float Control	■		■	■
29.	Drain Water Piping & Drip Pan			■	
30.	Reconnect Water Piping				■
31.	Align and Adjust Belts				■
32.	Check Fans for Alignment				■
33.					
34.					
35.					

OTHER EQUIPMENT INSPECTED:

	WEATHERMAKER	Monthly S	Monthly W	Shut Down	Start Up
36.	Oil Motor Bearings	■	■		
37.	Grease Fan Bearings	■	■		
38.	Grease Pump Bearings (29N)	■	■		
39.	Check Drive Belts	■	■		
40.	Check Fans for Alignment				■
41.	Check Filters *	■	■		
42.	Clean Expansion Valve Drip Pan & Drain			■ ■	
43.	Clean Drip Pan & Drain (39Q) (39R)			■	
44.	Clean O.A. Intake Screen	■	■		
45.	Check Expansion Valve Adjustments	■			■
46.	Clean Pump Strainer (29N)	■	■		
47.	Check Spray Nozzles Clean If Necessary (29N)	■ ■	■ ■		
48.	Drain Water Coils (Water Cooling)			■ ■	
49.	Reconnect Lines to Water Coils				■
50.					
51.					
	CONTROLS				
52.	Clean Commutators D.C. Motors	■	■	■	
53.	Check Thermostat Setting & Clean Points	■ ■	■ ■	■ ■	■ ■
54.	Check Contact Points in Starters. Clean If Necessary	■ ■	■ ■	■ ■	
55.	Check Steam Valves & Traps. Dirt, Leakage, etc.		■ ■	■ ■	
56.	Check Damper Motor on Weathermaker	■ ■	■ ■	■ ■	■ ■
57.	Observe Operation of System	■	■	■	■
58.	Check Controls on Water Cooler	■			■
59.	Air Controls — Drain Water	■	■		
60.	Clean Air Compressor Intake	■	■		
61.	Check Air Compressor Oil	■	■		
61a.	Oil Air Compressor Motor	■	■		
	GENERAL				
62.	Pump Down System			■	
63.	Test for Refrigerant	■			■
64.	Test for Leaks	■		■	■
65.	Check Damper Settings	■	■	■	■
66.	Check Well Water Pump	■			
	(a) Drain			■	
	(b) Connect Piping & Tighten Packing				■ ■
67.	Instruct Store Manager or Operator how to operate equipment and inform him of any changes or adjustments made.	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■

REMARKS AND RECOMMENDATIONS:

NOTE: ■ Indicates when operation necessary

See article by M. B. Goddard of Carrier Corp. in this issue.

MAINTENANCE CHECK LIST

Summer Cooling Installation

JOB NAME: _____

ADDRESS: _____

CUSTOMER: _____

ADDRESS: _____

CARRIER DEALER: _____

ADDRESS: _____

DATE INSPECTED: _____
INSPECTED BY: _____
MONTHLY INSPECTION: _____
START-UP REFRIG.: _____
SHUT DOWN REFRIG.: _____

	COMPRESSOR	Monthly	Shut Down	Start Up
1.	Oil Motor Bearings	■	■	■
2.	Check Drive Belts	■		
3.	Check Oil Level	■		■
4.	Check Head Pressure	■		■
5.	Check Suction Pressure	■		■
6.	Check Pressurestat Settings			■
7.	Check Rotation			■
8.	Slack Off Belts		■	
9.	Align and Adjust Belts			■
10.	Check Head Bolts	■	■	■
11.	Check Cylinder By-Pass Pressurestat Setting			■ ■
12.	Check Oil Pressure	■		■
	WATER COOLED CONDENSERS			
13.	Check Water Regulating Valve for Best Economy	■ ■		■ ■
14.	Drain Condenser		■	
15.	Reconnect Condenser Piping			■
	EVAPORATIVE CONDENSERS			
16.	Oil Motor Bearings	■	■	■
17.	Grease Fan Bearings	■	■	■
18.	Grease Pump Bearings	■	■	■
19.	Check Drive Belts	■		
20.	Slack Off Belts		■	
21.	Check Rotation of Fans			■
22.	Check Condition of Coils (Scale)	■	■	
23.	Check Spray Nozzles Clean if Necessary	■ ■	■ ■	■ ■
24.	Clean Drip Pan & Drain	■	■	
25.	Clean Water Strainer	■	■	
26.	Clean Pump Strainer	■	■	
27.	Clean Air Intake Screen	■	■	
28.	Check Float Control	■	■	■
29.	Drain Water Piping & Drip Pan		■	
30.	Reconnect Water Piping			■
31.	Align and Adjust Belts			■
32.	Check Fans for Alignment			■
33.				
34.				
35.				

OTHER EQUIPMENT INSPECTED

	WEATHERMAKER	Monthly	Shut Down	Start Up
36.	Oil Motor Bearings	■	■	■
37.	Grease Fan Bearings	■	■	■
38.	Grease Pump Bearings (29N)	■	■	■
39.	Check Drive Belts	■		
40.	Check Rotation of Fans			■
41.	Check Fans for Alignment			■
42.	Slack Off Belts		■	
43.	Align and Adjust Belts			■
44.	Check Filters	■	■	■
45.	Clean Exp. Valve Drip Pan & Drain		■	
46.	Clean Drip Pan & Drain (39Q) (39R)		■	
47.	Clean O.A. Intake Screen	■	■	■
48.	Check Exp. Valve Adjustments	■		■
49.	Check Pump Strainer (29N)	■	■	
50.	Check Spray Nozzles Clean if Necessary (29N)	■ ■	■ ■	
51.	Drain Water Coils (Water Cooling)		■	
52.	Reconnect Line to Water Coils			■
53.				
54.				
	CONTROLS			
55.	Clean Commutators D.C. Motors	■	■	
56.	Check Thermostat Setting & Clean Points	■ ■		■ ■
57.	Check Contact Points in Starters. Clean if Necessary	■ ■	■ ■	
58.	Check Damper Motor on Weathermaker	■ ■		■ ■
59.	Observe Operation of System	■		■
60.	Check Controls on Water Cooler	■		■
61.	Air Controls — Drain Water	■	■	
62.	Clean Air Compressor Intake	■	■	
63.	Check Air Compressor Oil	■	■	■
64.	Oil Air Compressor Motor	■	■	■
	GENERAL			
65.	Pump Down System		■	
66.	Test for Refrigerant	■		■
67.	Test for Leaks	■	■	■
68.	Check Damper Settings	■		■
69.	Check Well Water Pump	■		
	(a) Drain		■	
	(b) Connect Piping & Tighten Packing			■ ■
70.	Instruct Store Manager or Operator how to operate equipment and inform him of any changes or adjustments made.	■ ■ ■ ■ ■		■ ■ ■ ■ ■

REMARKS and RECOMMENDATIONS:

NOTE: ■ Indicates when operation necessary

See article by M. B. Goddard of Carrier Corp. in this issue.

WELDING Alloy Steel PIPING

Eric R. Seabloom Tells How to Weld, Braze, Solder Chromium-Nickel Types of Stainless Steel

TREMENDOUS STRIDES have been made in applying welding to fabrication and assembly of piping systems for both general and severe service. Brazing and soldering also have found application on moderate temperature piping installations. With the continuous increase in severity of operating conditions imposed on piping, welding has become almost a necessity in overcoming the difficulties experienced with most mechanical joints.

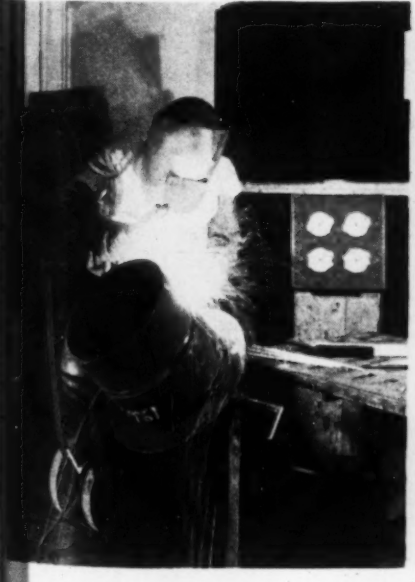
To meet the requirements that adverse operating conditions present, more alloy steels will be employed, and alloys such as chromium-molybdenum, straight chromium, and chromium-nickel grades will in most cases be adaptable. Although these steels are not as readily weldable as the more commonly used plain carbon steels, they can be successfully joined by various welding methods used in both shop and field. If suitable equipment and knowledge of the behavior of the steels when subject to welding heat are available, proper procedures can be drawn up to produce good results.

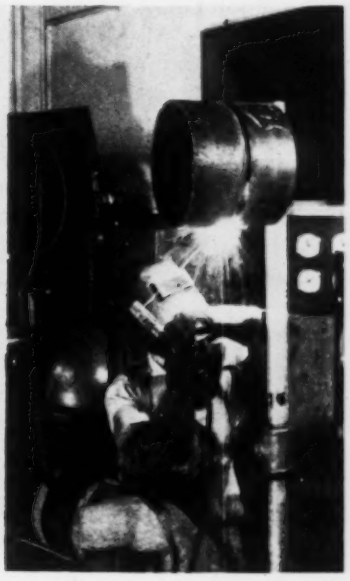
In a series of articles of which this is the third, the techniques generally employed and the cautions to be observed in dealing with the alloy steels are briefly discussed. The two previous articles covered the chromium-molybdenum and the straight chromium steels. The present article deals with the joining of the chromium-nickel stainless types, not only by welding but also by soldering and brazing, since the latter two methods are often employed on process piping.

A very important group of chromium steels are those containing nickel, plus other elements to a lesser degree, which are known as the austenitic chromium-nickel stainless types, although all of them are not austenitic. Nickel, when added in sufficient amounts, makes the steels austenitic and non-magnetic, with improved ductility and toughness over the straight chromium steels. Most of the chromium-nickel steels are classified by the American Iron and Steel Institute and the more important ones are given in Table 1.

These steels are outstanding in their resistance to corrosion and oxidation. They also display excellent physical properties at both subzero and elevated temperatures, and therefore find wide applications in the food, pulp, paper, textile, dye, chemical, oil refining, and related industries. However, corrosion often introduces many perplexing problems and the choice of material will depend upon fairly definite information regarding the conditions under which the equipment is to be used and the results that are expected from it. Corrosion must not only be considered from the standpoint of life of the equipment but also from the view of discoloration or contamination of the product being handled.

The usual positions of welding as defined by the American Welding Society and various codes. These pictures show an operator making his qualifying tests on fillet welds. Left—1-F weld, inclined horizontal rolled position, flat weld. Center—Type 2-F weld, horizontal rolled or vertical position, horizontal weld. Right—Type ¾-F weld, horizontal fixed position, vertical and overhead welds.





MAINTENANCE CHECK LIST

Summer Cooling Installation

JOB NAME: _____

ADDRESS: _____

CUSTOMER: _____

ADDRESS: _____

CARRIER DEALER: _____

ADDRESS: _____

DATE INSPECTED: _____
INSPECTED BY; _____
MONTHLY INSPECTION: _____
START-UP REFRIG.: _____
SHUT DOWN REFRIG.: _____

	COMPRESSOR	Monthly	Shut Down	Start Up
1.	Oil Motor Bearings	■	■	■
2.	Check Drive Belts	■		
3.	Check Oil Level	■		■
4.	Check Head Pressure	■		■
5.	Check Suction Pressure	■		■
6.	Check Pressurestat Settings			■
7.	Check Rotation			■
8.	Slack Off Belts		■	
9.	Align and Adjust Belts			■
10.	Check Head Bolts	■	■	■
11.	Check Cylinder By-Pass Pressurestat Setting			■ ■
12.	Check Oil Pressure	■		■
	WATER COOLED CONDENSERS			
13.	Check Water Regulating Valve for Best Economy	■ ■		■ ■
14.	Drain Condenser		■	
15.	Reconnect Condenser Piping			■
	EVAPORATIVE CONDENSERS			
16.	Oil Motor Bearings	■	■	■
17.	Grease Fan Bearings	■	■	■
18.	Grease Pump Bearings	■	■	■
19.	Check Drive Belts	■		
20.	Slack Off Belts		■	
21.	Check Rotation of Fans			■
22.	Check Condition of Coils (Scale)	■	■	
23.	Check Spray Nozzles Clean if Necessary	■ ■	■ ■	■ ■
24.	Clean Drip Pan & Drain	■	■	
25.	Clean Water Strainer	■	■	
26.	Clean Pump Strainer	■	■	
27.	Clean Air Intake Screen	■	■	
28.	Check Float Control	■	■	■
29.	Drain Water Piping & Drip Pan		■	
30.	Reconnect Water Piping			■
31.	Align and Adjust Belts			■
32.	Check Fans for Alignment			■
33.				
34.				
35.				
	OTHER EQUIPMENT INSPECTED			

	WEATHERMAKER	Monthly	Shut Down	Start Up
36.	Oil Motor Bearings	■	■	■
37.	Grease Fan Bearings	■	■	■
38.	Grease Pump Bearings (29N)	■	■	■
39.	Check Drive Belts	■		
40.	Check Rotation of Fans			■
41.	Check Fans for Alignment			■
42.	Slack Off Belts		■	
43.	Align and Adjust Belts			■
44.	Check Filters	■	■	■
45.	Clean Exp. Valve Drip Pan & Drain		■	
46.	Clean Drip Pan & Drain (39Q) (39R)		■	
47.	Clean O.A. Intake Screen	■	■	■
48.	Check Exp. Valve Adjustments	■		■
49.	Check Pump Strainer (29N)	■	■	
50.	Check Spray Nozzles Clean if Necessary (29N)	■ ■	■ ■	
51.	Drain Water Coils (Water Cooling)		■	
52.	Reconnect Line to Water Coils			■
53.				
54.				
	CONTROLS			
55.	Clean Commutators D.C. Motors	■	■	
56.	Check Thermostat Setting & Clean Points	■ ■		■ ■
57.	Check Contact Points in Starters. Clean if Necessary	■ ■	■ ■	
58.	Check Damper Motor on Weathermaker	■ ■		■ ■
59.	Observe Operation of System	■		■
60.	Check Controls on Water Cooler	■		■
61.	Air Controls — Drain Water	■	■	
62.	Clean Air Compressor Intake	■	■	
63.	Check Air Compressor Oil	■	■	■
64.	Oil Air Compressor Motor	■	■	■
	GENERAL			
65.	Pump Down System		■	
66.	Test for Refrigerant	■		■
67.	Test for Leaks	■	■	■
68.	Check Damper Settings	■		■
69.	Check Well Water Pump	■		
	(a) Drain		■	
	(b) Connect Piping & Tighten Packing			■ ■
70.	Instruct Store Manager or Operator how to operate equipment and inform him of any changes or adjustments made.	■ ■ ■ ■ ■		■ ■ ■ ■ ■

REMARKS and RECOMMENDATIONS:

NOTE: ■ Indicates when operation necessary

See article by M. B. Goddard of Carrier Corp. in this issue.

WELDING Alloy Steel PIPING

Eric R. Seabloom Tells How to Weld, Braze, Solder Chromium-Nickel Types of Stainless Steel

TREMENDOUS STRIDES have been made in applying welding to fabrication and assembly of piping systems for both general and severe service. Brazing and soldering also have found application on moderate temperature piping installations. With the continuous increase in severity of operating conditions imposed on piping, welding has become almost a necessity in overcoming the difficulties experienced with most mechanical joints.

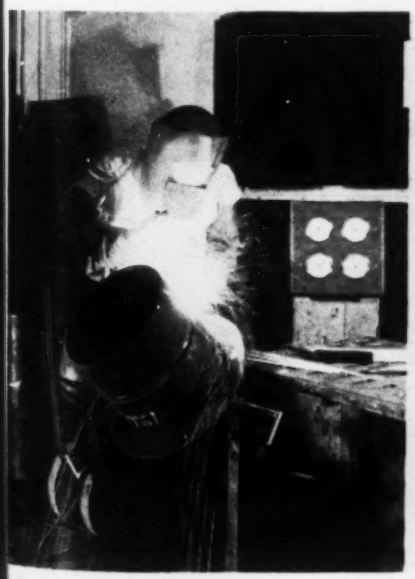
To meet the requirements that adverse operating conditions present, more alloy steels will be employed, and alloys such as chromium-molybdenum, straight chromium, and chromium-nickel grades will in most cases be adaptable. Although these steels are not as readily weldable as the more commonly used plain carbon steels, they can be successfully joined by various welding methods used in both shop and field. If suitable equipment and knowledge of the behavior of the steels when subject to welding heat are available, proper procedures can be drawn up to produce good results.

In a series of articles of which this is the third, the techniques generally employed and the cautions to be observed in dealing with the alloy steels are briefly discussed. The two previous articles covered the chromium-molybdenum and the straight chromium steels. The present article deals with the joining of the chromium-nickel stainless types, not only by welding but also by soldering and brazing, since the latter two methods are often employed on process piping.

A very important group of chromium steels are those containing nickel, plus other elements to a lesser degree, which are known as the austenitic chromium-nickel stainless types, although all of them are not austenitic. Nickel, when added in sufficient amounts, makes the steels austenitic and non-magnetic, with improved ductility and toughness over the straight chromium steels. Most of the chromium-nickel steels are classified by the American Iron and Steel Institute and the more important ones are given in Table 1.

These steels are outstanding in their resistance to corrosion and oxidation. They also display excellent physical properties at both subzero and elevated temperatures, and therefore find wide applications in the food, pulp, paper, textile, dye, chemical, oil refining, and related industries. However, corrosion often introduces many perplexing problems and the choice of material will depend upon fairly definite information regarding the conditions under which the equipment is to be used and the results that are expected from it. Corrosion must not only be considered from the standpoint of life of the equipment but also from the view of discoloration or contamination of the product being handled.

The usual positions of welding as defined by the American Welding Society and various codes. These pictures show an operator making his qualifying tests on fillet welds. Left—1-F weld, inclined horizontal rolled position, flat weld. Center—Type 2-F weld, horizontal rolled or vertical position, horizontal weld. Right—Type ¾-F weld, horizontal fixed position, vertical and overhead welds.



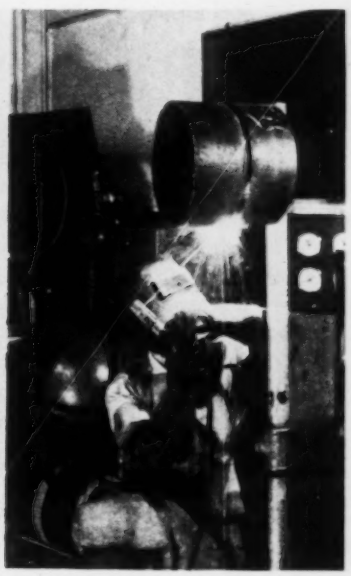


Table 1—Chromium-nickel stainless steels

AISI Type	Popular Name	Carbon Content	Chromium Range	Nickel Range	Other Elements
302	18-8	0.08–0.20	17.00–19.00	8.00–10.00	Mn 2.00 max.
304	19-9	0.08 max.	18.00–20.00	8.00–10.00	Mn 2.00 max.
308	19-9	0.08 max.	19.00–22.00	10.00–12.00	Mn 2.00 max.
309*	25-12	0.20 max.	22.00–24.00	12.00–15.00	Mn 2.00 max.
310*#	25-20	0.25 max.	24.00–26.00	19.00–22.00	Mn 2.00 max.
316*	18-12-2	0.10 max.	16.00–18.00	10.00–14.00	Mo 2.00–3.00 Mn 2.00 max.
317	19-14-3	0.10 max.	17.50–20.00	10.00–14.00	Mo 3.00–4.00 Mn 2.00 max.
321	19-9ti	0.10 max.	17.00–19.00	8.00–12.00	Ti 4xc. min. Mn 2.00 max.
329	25-3-1½	0.20 max.	23.00–25.00	2.50– 5.00	Mo 1.00–2.00
347	19-9cb	0.10 max.	17.00–19.00	8.00–12.00	Cb 8xc. min. Mn 2.00 max.

*Welding rod available with columbium additions.
#Welding rod available with molybdenum additions.

Characteristics Pertinent to Weldability

Most of the austenitic chromium-nickel steels are readily weldable by the processes generally employed in fabrication and erection of piping, such as oxyacetylene, atomic hydrogen, and metallic arc. They are also joined by means of soldering and brazing, where elevated temperatures are not encountered or high strength joints are not required. Welds in most of these alloys are strong, ductile, and tough in the as-welded condition. Heat treatment after welding does not improve physical properties, but is a requisite on some alloys to obtain maximum corrosion resistance as will be explained later.

All of these steels have certain characteristics which must be taken into account when welding.

1) The coefficient of thermal expansion is about 50 per cent greater than plain carbon steel. Consequently, distortion and warpage may become problems but they can generally be taken care of by adequate spacing of the welding groove openings.

2) The thermal conductivity is about 50 per cent less than plain carbon steel, hence heat is retained longer and the work cools off more slowly. Since the heat conductivity is low, localized high temperature areas adjacent to the welds will be encountered and when combined with the effect of high thermal expansion, greater distortion usually occurs.

3) The melting points of stainless steels are slightly lower than those of plain carbon steels, thus somewhat less heat is required to make welds.

4) The electrical resistance is about 6 to 12 times that of plain carbon steel, which means that when arc welding, lower welding currents can be employed.

5) These alloys, as a rule, do not respond to heat treatment. They cannot be hardened, nor can grain growth due to high welding heats be reduced except by cold working.

The structural stability of most austenitic chromium-nickel steels is affected by heat. When subjected to temperatures between 800 and 1600 F, as occurs during welding or in service, these steels undergo a structural change. Carbon migrates out from the solid solution, combining with the chromium forming chromium carbides along the grain boundaries, as revealed through metallographic examination. The effect is known as carbide precipitation and this action impoverishes the chromium content adjacent to the grain boundaries, thus increasing the susceptibilty to corrosive attack, leading to what is generally referred to as intergranular corrosion.

Carbide precipitation is influenced by several factors. The longer the metal is held within the range of 800 to 1600 F the more carbides will precipitate and the closer to 1200 F the temperature is maintained the more undesirable will be the structural change. Higher carbon contents increase the formation of carbide precipitates, since there is more carbon to combine with the chromium.

In handling of mild corrosive media in a piping system, carbide precipitation may be of minor importance, especially if the carbides at the grain boundaries are present in only a small amount, although high stresses will increase the susceptibility to corrosion. However, if highly corrosive agents are being conveyed then severe attack may occur even though stresses are low.

Carbide precipitation can be corrected by heat treatment. This is accomplished by heating the metal to about 1950 F for a sufficient time period to redissolve the carbides and allow them to go back into solution, followed by quick cooling to below 800 F. The cooling cycle should be rapid through the 1600 to 800 F range to avoid the possibility of carbides forming again.

In many cases pipe fabrications cannot be subjected to such drastic treatment and in field erection it is practically impossible to follow such a procedure. As mentioned previously, it is not always necessary to heat treat, since in many installations the corrosive environment is relatively mild and a fair degree of corrosion resistance can be accomplished by selecting the best welding method to minimize the time of heat application.

Referring to Table 1, it will be observed that some of the steels have columbium or titanium additions. Such additions, known as stabilizers, tend to combine with the carbon to retard the formation of the objectionable grain boundary chromium carbides, thus reducing the susceptibility to intergranular corrosion. Titanium addition is not as effective in welding rod as in the base metal, because much if it is lost during metal transfer from the rod to the work while welding. The recovery of columbium in the welding process is more satisfactory.

In making weldments with columbium stabilized materials, the welds and heat affected zones can pass through the heat sensitizing range 800 to 1600 F without too much danger of carbide precipitation, and, consequently, heat treatment can often be dispensed with. When proper procedures are followed, welds in chromium-nickel steels will display high strength, great toughness, ductility, and complete soundness, meet-

JOINING THE chromium-nickel types of stainless steel not only by welding but by brazing and soldering is dealt with by Mr. Seabloom, supervising engineer, Crane Research Laboratories, this month since the latter two methods are often employed for certain process piping. His material is reproduced from Valve World.

ing the requirements of the ASME Boiler Code and the ASA Code for Pressure Piping on procedure and operator qualification tests.

Gas Welding

The austenitic chromium-nickel stainless steels can be welded by the oxyacetylene flame, although the process is the most applicable to the lighter wall thicknesses, due to greater spread of heat and longer heating time for melting, causing more distortion and carbide precipitation. Oxyacetylene welding finds its widest usage with the smaller diameter, light gage, columbium stabilized tubing.

Generally, welding tips should be one or two sizes smaller than those used for plain carbon steel and a neutral flame is preferred. An oxidizing flame should be avoided since chromium oxidizes readily and will be burned out, while a reducing flame increases the carbon content of the welds, which is also undesirable. It is essential to employ a flux, as chromium oxidizes easily when molten, regardless of careful flame adjustment. Several special fluxes are marketed for this purpose and when applied to the welding grooves and rod, combined with minimized puddling of the metal during deposition, chromium oxides can be materially reduced.

In order to obtain the best corrosion resistance in the deposited metal, it is desirable to select welding rods containing slightly higher chromium, manganese, and silicon than the base metals to allow for reduction of these elements in the welding flame.

Welding grooves recommended are the single vee butt joints, fillet or socket joints, and nozzle connections as shown in the previous articles. Socket type fittings may not be available in all grades of these alloys. Welds can be made in all positions.

Atomic Hydrogen Welding

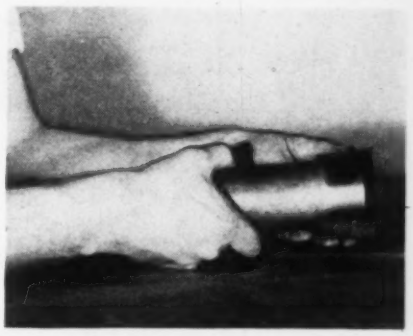
The chromium-nickel stainless steels can also be welded by the atomic hydrogen process, but as in oxyacetylene welding it is most applicable to the thinner wall thicknesses of tubing because the spread of heat and longer heating time cause distortion and carbide precipitation on heavier walls. Best results are obtained with stabilized tubing in the smaller diameters and lighter gages. The hydrogen atmosphere surrounding the arc reduces the chromium oxides, hence no flux is required. Since there is no carbon present in the welding flame, no carbon pickup in the deposited metal is encountered and special rods, as a rule, are not required. Single vee butt joints, fillet or socket joints, and nozzle connections as shown in the previous articles are recommended, but welding should preferably be in the downhand or roll position.

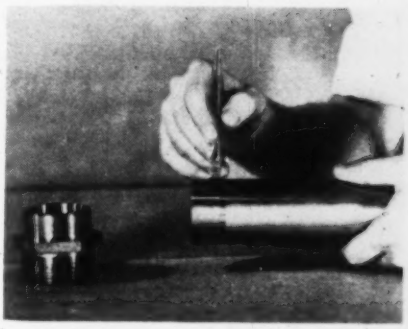
Metallic Arc Welding

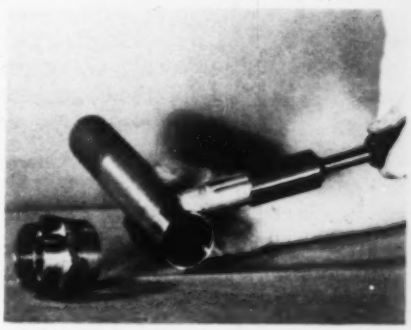
Metallic arc welding is generally the preferred method of joining chromium-nickel stainless steels, since most of the important factors are better controlled by this process. The highly localized welding heat produced by the arc narrows the heat affected zones in the parent metals and the time at temperature is reduced, thus minimizing distortion and carbide precipitation. Electrode coatings protect the arc stream of molten metal from gases in the atmosphere and often serve as a means of introducing alloying elements or compensating for their losses in the arc. A wide choice of welding electrodes is available with coatings for both direct and alternating current deposition which give weld metal analyses matching those of the parent materials. The electrode coatings usually contain fluxing agents to dissolve the refractory chromium oxides and the control of the carbon content in the weld deposits is obtained by the use of low carbon core wire and avoiding carbonaceous materials in the coatings.

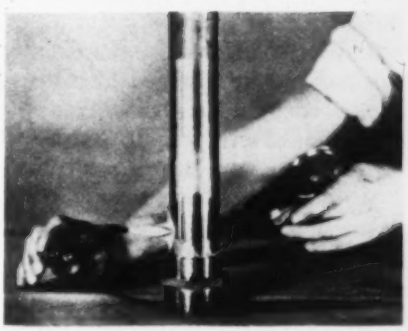
Generally, no difficulty is encountered in making excellent arc welds, since the weld metal flows smoothly giving deposits that are almost free of ripples, the only caution being correct arc length and heat setting. A short arc should be held to prevent the oxygen in the surrounding atmosphere from breaking through the gas envelope emitted by the burning electrode coating. A long arc results in oxidation of some of the chromium, thus reducing the chromium content of the deposited metal, which consequently reduces the corrosion resistance. The proper arc length is one which does not smother the arc and yet is not so long that it will cause undue oxidation of the chromium.

The proper arc length cannot be maintained unless the welding current is correctly adjusted. Welding heat is slightly less than would be









Steps in making a solder joint—First, the outside of the tube and the inside of the fitting are cleaned with emery cloth. Second, flux is applied to both tube and fitting. Third, outside of tube and inside of fitting are tinned. Fourth, tube is inserted into fitting, heat from torch is applied to tube until solder melts and tube slips completely into fitting. Additional solder is fed around edge of fitting to fill joint and build up slight fillet.

used for the same work in mild carbon steel. If high current is employed the core wire becomes red hot, due to the high electrical resistance of stainless steels and the arc becomes difficult to handle. The general rule is to keep the current as low as possible without choking or sticking of the electrode.

Carbide precipitation will occur with arc welds in some of the stainless alloys and if heat treatments cannot be accomplished it is best to use stabilized alloys.

The types of welding grooves recommended for arc welding are the single vee butt joints with or without backing rings, fillet or socket joints, and nozzle connections as illustrated in the previous articles. Welds can generally be made in all positions as shown herewith and also by the photos on page 67 of the October article. Electrode sizes used are generally smaller than those employed for plain carbon steel and seldom exceed $\frac{3}{16}$ in. diameter.

Preheating

Preheating, as a rule, is not employed when welding the chromium-nickel steels since these alloys are generally very ductile and non-air hardening. As explained previously, it is advisable to minimize heating during welding to prevent carbide precipitation and preheating tends to increase the time at temperature.

Heat Treatments

When maximum corrosion resistance is required in welding unstabilized chromium-nickel steel piping, the prescribed heat treatment consists of heating the assemblies in a furnace to about 1950 F for sufficient time to allow the carbides to go back into solution. This should be followed by rapid cooling to keep the carbon in solution. On relatively light gages, air blast cooling is sometimes sufficient, but on heavier walls water spray or quenching is necessary in order to effect quick cooling through the carbide precipitation range of 1600 to 800 F.

Another method of heat treatment that is being given some consideration lately, particularly when stainless alloys are to be employed in high temperature service, is an agglomerizing or stabilizing treatment. This consists of a long time soaking of the welded assemblies in a furnace at 1550 to 1600 F followed by air cooling. It was mentioned previously that when chromium-nickel steels are exposed to temperatures ranging from 800 to 1600 F the carbides precipitate along the grain boundaries. In the stabilizing treatment, the heating time is quite prolonged in comparison to the heat exposure during welding or the quenching treatment previously described. This stabilizing treatment allows the carbides to precipitate and disperse within the grains, thus placing the alloys in better condition to resist corrosion at elevated temperatures.

When columbium or titanium stabilized chromium-nickel alloys are to be used at elevated temperatures, these are also placed in better condition by the stabilizing treatment.

Brazing and Soldering

Several grades of chromium-nickel stainless steels are used extensively in the food industries, handling such media as milk, milk products, lactic and butyric acids, fruit juices, vegetable juices, vinegar, and practically all cooked or prepared food products. Such piping systems must be demountable for easy handling and cleaning. Consequently, light weight tubing is employed in relatively short lengths with stainless steel fittings, unions, and union fittings to facilitate dismantling and reassembly. Since the requirements of sanitary piping demand that joints be designed to eliminate food pockets so that contamination cannot occur, solder joints between tubing and fittings or union connections with ends bored with a shoulder that matches the inside tubing diameter are employed. Often stainless piping is used in the drug, soap, cosmetics, and other chemical industries although sometimes heavier types of standard fittings are utilized.

There are many grades of soft solders and silver solders available, listed by ASTM specifications B32-40T and B73-29, as well as some proprietary silver brazing alloys, but only a few of these are used to any extent in the joining of stainless steel piping.

Widely used soft solders are listed in Table 2, which gives their compositions, melting ranges and service temperature recommendations.

Joints between stainless tubing and fittings are most readily made with the 50-50 tin-lead or 60-40 tin-lead solders. However, many health authorities prohibit the use of solders containing substantial quantities of lead on food products piping, although the amount of solder exposed to the fluid in a capillary type of joint is negligible. Solder joints with sanitary fittings are, therefore, most frequently made up using pure tin. The 95-5 tin-lead and the 95-5 tin-antimony solders are also employed occasionally.

With all of these solders, including pure tin, it is necessary to use suitable fluxes to prevent oxidation of the surfaces to be joined, to dissolve the oxides that form while heating, and to aid the flow of solder. While the zinc chloride - ammonium chloride flux usually employed in general soldering will give a fair degree of success, it is better to prepare a flux by mixing two-thirds "zinc cut" muriatic (hydrochloric) acid with one-third raw or uncut muriatic acid, since a stronger flux is required with stainless steel because of the chromium oxide which forms when heating. Several proprietary soft soldering fluxes are available on the market and are generally preferred for soldering of stainless steel.

For best results in making tube to fitting joints it is very essential to thoroughly clean the outside area of the tube to be joined and also the bore of the fitting with emery cloth. It is necessary to tin both surfaces prior to the final soldering assembly. This can be accomplished in two ways. One is to brush flux on the surfaces including the end of the tube and the edge of the fitting, then tin the outside and inside surfaces with a soldering iron, preferably one which has a convex-concave copper to give the better contact with the curved sur-

Table 2—Soft solders

Composition			Melting Range, F		Max. Service
Tin %	Lead %	Antimony %	Solid	Liquid	Temp., F
50	50		361	421	250
60	40		361	372	250
95	5		361	437	250
95		5	450	464	250–300
100			450	450	250–300

faces. Since the tube can only be partially inserted into the fitting after tinning, it is advisable to prepare the final assembly in the vertical position. Apply heat to the fitting and tube by means of an oxyacetylene or air-acetylene torch, avoiding a direct flame on the tinned surfaces, until the solder melts and tube slips into fitting bore. While the solder is still molten, feed additional solder around the edge of the fitting to assure complete filling of joint and build up a slight fillet.

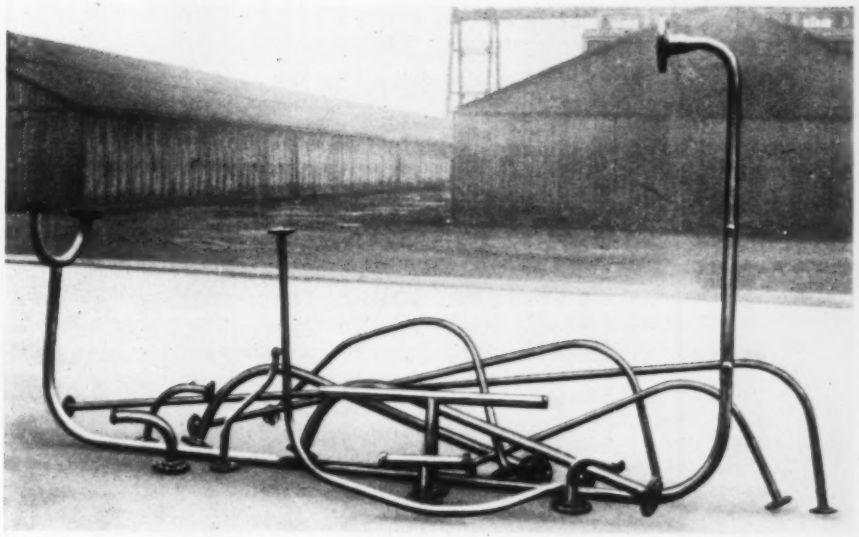
The other method of tinning and joining is to flux the tube and fitting, then dip into a pot of molten solder until the parts reach the temperature of the bath, although both parts need not be heated simultaneously. Upon removing, incomplete tinning may be encountered, brush on flux, return immediately into molten solder bath, and hold until solder adheres to surfaces. If tinning is not complete, repeat the fluxing and heating operations. When both parts are completely tinned hold them in the bath until the melting point of the solder is reached, remove and insert the tube into the fitting while applying additional heat with a torch and feeding solder around edge of fitting as described above.

Since fluxes are necessarily corrosive, it is essential to remove all traces after soldering. This can be done by thoroughly wiping or rinsing the assembly in hot water, a water-soap solution, or a dilute mixture of ammonia.

Brazing

Brazed joints are also made between stainless tubing and fittings employing silver brazing alloys. A number of standard silver solders or brazing alloys, as listed in ASTM Specification B73-29, have been used for many years, but since their melting points, ranging from 1250 to 1600 F, are relatively high, some of the proprietary alloys are more popular due to lower melting temperatures.

When severe corrosive conditions are encountered, such as chloride solutions, the alloy shown in Table 3 containing nickel is recommended. Both alloys display high strength when proper joint clearances are provided and they can be used in joining piping operating at temperatures up to 550 F.



Typical austenitic stainless steel piping fabricated by bending and welding

In making joints, the two types of fittings generally employed are those that require outside feed and those with reservoirs for the brazing alloy inside the fitting bores. With either type, it is necessary to thoroughly clean the bores and the tubes with emery cloth prior to fluxing.

The temperature required for silver brazing causes a refractory chromium oxide to form on heated surfaces and a suitable flux must be used to give protection against oxidation, to dissolve the oxides that do form, and to aid in flowing of the brazing alloy. While the more common boric acid-borax fluxes give fair results, it is best to employ a flux having a potassium fluoride base. Such a flux comes in paste form that starts to liquefy at 900 F and is very active at 1200 F. The flux can be thinned with water to the desired consistency and should be brushed onto the surfaces to be joined.

After the tube has been inserted into the fitting apply heat to both parts, preferably with an oxyacetylene torch, and when larger tubing sizes are handled a multitip torch will give better results. When plain fittings are used, feed the brazing alloy into the joint around the edge until the capillary clearance is filled and a slight fillet is formed. With fittings having a pre-inserted alloy ring, heat the assembly until a fillet of alloy appears around the edge of the fitting. Sometimes it is necessary to feed additional brazing alloy around the edge to complete the joint. The heat should be applied quickly in both cases, avoiding overheating as chromium oxides form rapidly and it will be impossible to make a braze. Proper heat can be judged by watching the flux, as this is completely molten at 1100 F. Prolonged heating or overheating will cause carbide precipitation with consequent lowering of corrosion resistance. Stabilized alloys will overcome this objection.

After brazing, excess or fused flux should be removed with hot water.

* * *

Acknowledgments — The author wishes to acknowledge the valuable assistance of his associates in the research and metallurgical laboratories of Crane Co. in furnishing much of the data in these articles. Special thanks are due H. A. Young and J. J. Kanter for their suggestions, to W. L. Meinhart for the excellent metallographic studies, I. H. Carlson and R. A. Mueller for the welding investigations, and J. B. Flad and W. W. Wilke, Jr. for the photographic work.

Table 3—Two proprietary brazing alloys

Chemical Composition					Melting Range, F	
Silver %	Copper %	Zinc %	Cadmium %	Nickel %	Solid	Liquid
50	15½	16½	18		1160	1175
50	15½	15½	16	3	1195	1270

THREE BASIC SOURCES

Heat for the Heat Pump

The Use of Air, Underground Water, and the Earth Itself Are Discussed in this Article by Emory N. Kemler

THE BASIC problem in planning any heating plant, whether it uses fuel or a heat pump, is an economical and satisfactory source of heat. In considering the heat pump there are three basic sources of heat in nature which can be utilized. These are the air, underground water, and the earth itself. Of course, to these might be added radiant energy from the sun, and local bodies of water such as lakes and rivers. While each of these heat sources offers possibilities, no comprehensive surveys have been made of their scope of application or their limitations. It is certain that no one of these heat sources will best fit all conditions and each local area or region of the country will probably have a best source, or combination of sources. As will be pointed out later, each of the heat sources mentioned has both its merits and disadvantages.

The heat source which appears to have the most universal application, the earth, has received little general study. The survey of literature on the subject shows that there is little information available on the characteristics of the earth as to its ability to transfer heat. Even such information as is available cannot be used with any degree of reliability or confidence insofar as continued utilization is concerned. The earth represents an inexhaustible supply of heat at reasonable temperatures when used in connection with a heat pump for year-around comfort air conditioning. The wide variation in the characteristics of the earth's surface, both with regard to composition and climatic conditions, indicates that research of a fundamental nature should be undertaken for the purpose of developing design data and to correlate data already available or rapidly becoming available from actual installations in the field.

Air as a Heat Source

One of the universal sources of heat, and perhaps the most common for heat pump usage, is the surrounding air. Because of its convenient and general availability and ease of movement it appears to be, at first thought, a general answer to the problem. However, the heat pump cycle efficiency drops off rapidly as the source temperature decreases. This may be noted by an analysis of the theoretical Carnot cycle. Since heating requirements increase as the outside temperature drops, the air-to-air unit requires increased size in order to make up for this decrease in efficiency as the output requirements increase. Where heating is the controlling load on the heat pump, and where low outside air temperatures are encountered, the air-to-air unit will require a larger horsepower capacity unit than the water-to-air unit. Where the cooling requirement imposes the maximum load, the air-to-air unit may not be penalized in this respect.

The air-to-air unit is basically larger in size than the water-to-air unit because the air heat exchanger is larger than the liquid heat exchanger and provision must be made to bring the outside air to, through, and from the unit. Because the temperature drop in the air from which heat is abstracted must be kept low, large volumes of air must be handled. This introduces noise problems, and unless the heating unit is conveniently located to an outside air source, will require a considerable amount of power.

Practical considerations would appear to limit the air-to-air unit to use where the outside temperature is above 10 to 20 F. There are, however, many possible modifications of current heat pump cycles which may result in improved performance and capacity and permit its application to lower temperatures. One factor in favor of air-to-air units is the fact that as the outside temperature increases the performance improves. Experience with commercial installations in southern California has shown that while the coefficient of performance for minimum conditions may be between 3 and 4, the average coefficient of performance as measured over the heating season may be between 5 and 6. This is because so much of the heating is done when the

THE FUNDAMENTAL selection in planning any heating system, whether it uses fuel or a heat pump, is based on a satisfactory and economical source of heat. Air, underground water, and the earth itself are the three basic sources which may be used with the heat pump. The advantages, disadvantages, and limitations of each are discussed here in the first of two articles based on a survey conducted by the Southern Research Institute, Birmingham. The survey was sponsored by the electric utilities of the southeast through their association, the Southeastern Electric Exchange. Mr. Kemler is head of engineering research at this institute.

outside air temperature range is from 50 to 70 F which gives a very high coefficient of performance for this temperature range. The potentialities of the air-to-air heat pump have not been fully realized and many improvements can be expected as experience points out the demand or necessity for such improvements.

Ground Water as a Heat Source

Ground water as a general source of heat for heat pump operation is not practical unless some means is used to return the water to the underground reservoir. Any general widespread usage of ground water resources without returning them would in most localities result in depletion of these resources and would not be in the public interest. There are specific areas, however, where there are sufficient resources to permit pumping and discarding them. This is particularly true in coastal regions. It is also possible to utilize dual wells so that water can be pumped from one and returned to another. The practicality of this recycling will depend upon local conditions, well spacing, etc. Where there are shallow, thick watersands, this may be a very economical and practical means of obtaining the heat.

The general advantage of utilizing water as the source of heat is the fact that it will be at essentially the same temperature during the entire heating season which results in a more compact unit. By having a uniform source temperature, it is possible to build a unit which can be designed to operate at capacity. It will also operate at this capacity independent of heating requirements, hence is able to deliver at maximum capacity when this capacity is most needed. Thus it will be seen that water as a heat source offers many important advantages. Its most important disadvantage is that it is necessary to first locate an adequate supply. Disposal of the water after heat extraction also offers problems in many areas. The few cases or limited areas where ground water is readily available and can be easily disposed of are so limited that this source of heat can not be considered as a general solution.

The approximate or theoretical amounts of water required for supplying heat may be determined by the equation

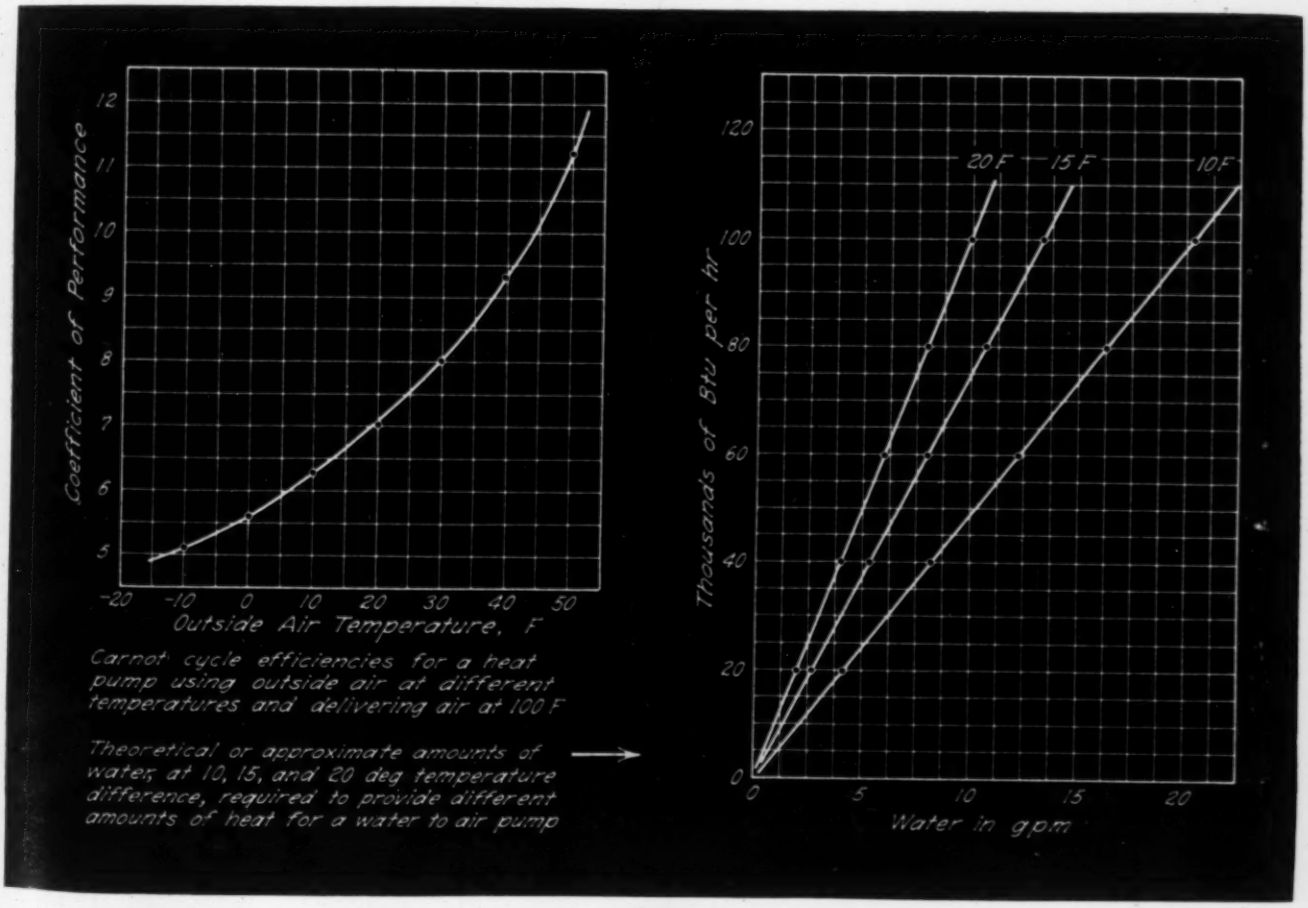
$$\text{gpm} = \frac{\text{Btu per hr}}{60 \times 8.33 \times \Delta t}$$

where gpm = gal per min of water; 8.33 = lb of water per gal; and Δt = water temperature difference, deg.

Generally speaking, the maximum temperature difference which can be used in the colder areas of the country is 10 deg, whereas 20 deg may often be used in the Gulf Coast region. Heat exchanger economics and size will also be a factor in determining the temperature difference to be used.

Earth as a Heat Source

The most universal source of heat which is available is the earth. For example, a cylinder of earth 30 ft in diameter and 100 ft deep will give up 28,000,000 Btu, if its temperature is lowered only 10 F. If we assume a 100 ft depth and a heat pump unit delivery of 50,000 Btu per hr operating an average of 20 per cent of the time over a five months heating season, the drop of 10 deg in a 30 ft diameter cylinder would approximately supply the heat needed for the entire heating season if no heat flowed into the region. There is no question as to the capacity of the earth to supply the heat, the only problem is the



mechanism necessary to obtain this heat.

Many schemes have been proposed for obtaining this heat from the earth. Two have been tried out and offer possibilities. In one system that has been proposed a hole is drilled in the ground to a depth so that there will be a fluid level of about 200 ft. A closed U tube is inserted in the well, and a pump is used to circulate water or other fluid through this pipe to pick up heat from the well which in turn obtains heat from the ground. The heat is extracted from this fluid in the normal evaporator and the water continues its circulation. This system has many advantages over the circulation of the water itself. The fluid in the U tube can be inhibited to eliminate corrosion in the heat exchanger system, the utilization of the same fluid eliminates fouling up of the heat transfer surfaces and power requirements are kept to a minimum since the only work done is that necessary to overcome friction in the system. This system has been used in connection with experimental units and is reported to be very satisfactory for heat pump installations. One obvious objection to this system is the expense involved in digging a well. This expense is, however, offset by generally lower operating costs.

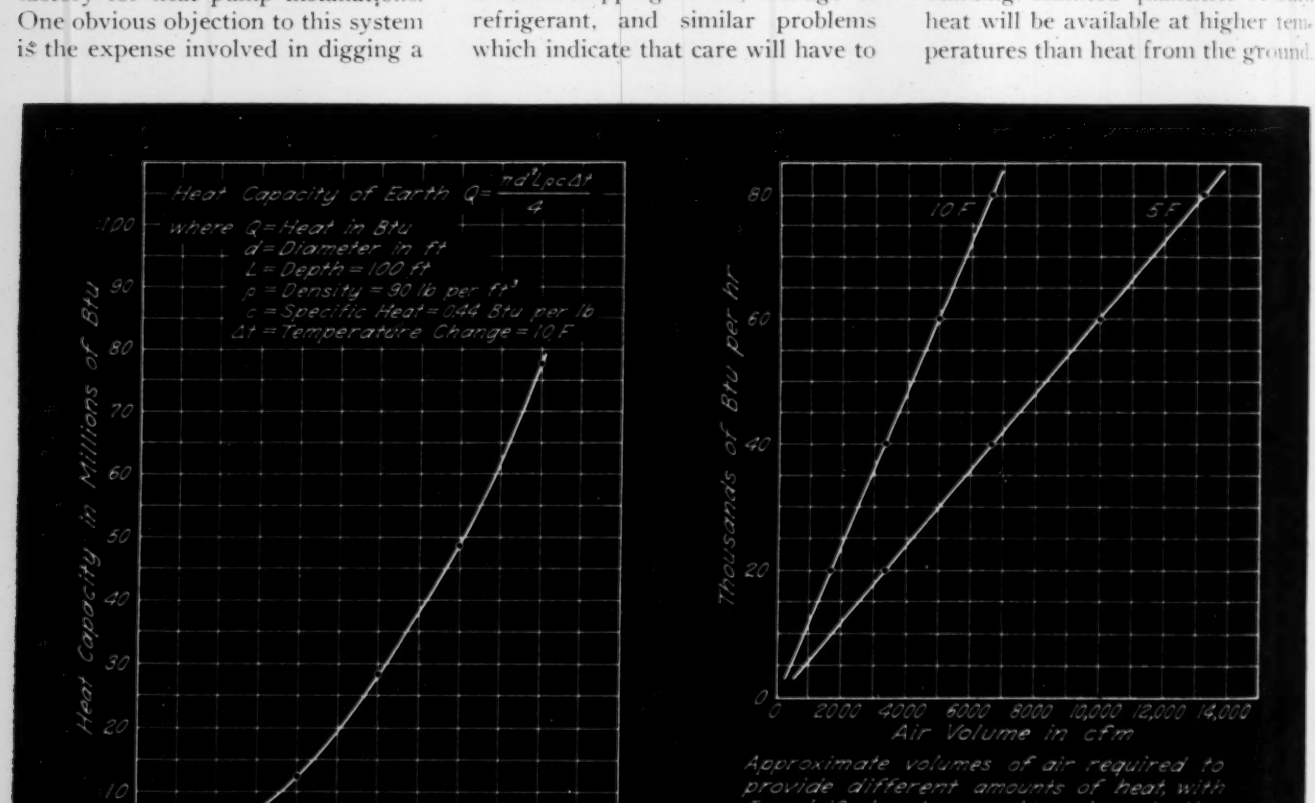
A modification of the above system is one in which the water from the well bore is itself circulated in the system. This method would require frequent cleaning of the heat transfer surfaces and would intensify the corrosion problem through continued agitation of the water in the well.

The next type of system which can be used in connection with heat pump installations is that in which the secondary heat exchange surface is now buried in the ground. The fluid is circulated through the pipes as in the case of the well. This system merely substitutes the burying of pipes for the digging of a well. It is not as desirable, however, because of the generally lower temperature during the heating season as will be pointed out in a later section on ground and ground water temperatures.

An obvious modification of the system is to make the pipes serve as the evaporator. This then eliminates one heat exchanger. It does, however, introduce some operating hazards in trapping of oil, leakage of refrigerant, and similar problems which indicate that care will have to be exercised in both design and installation of heat source systems.

Other Sources

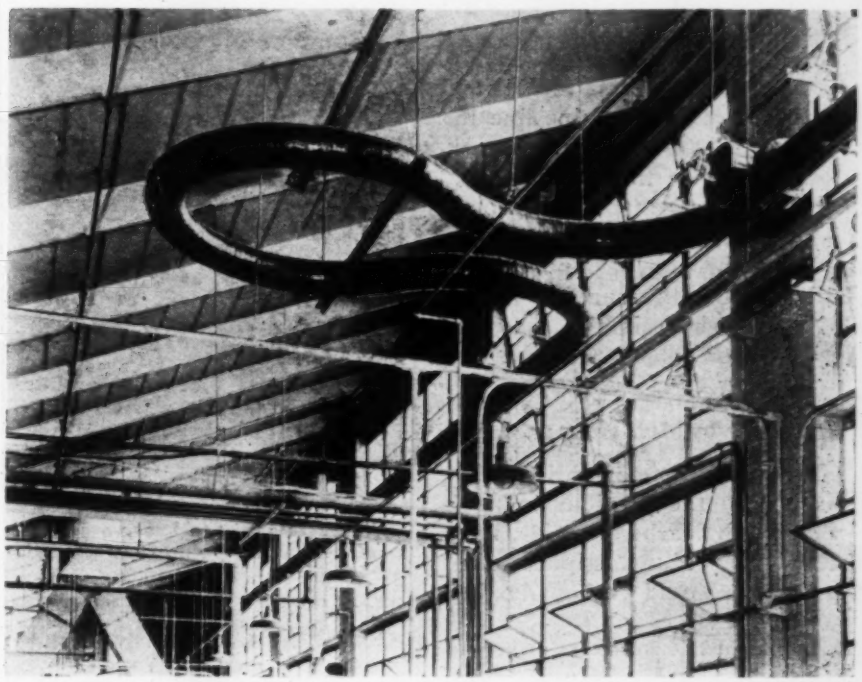
There are many other possible sources of heat, most of which depend upon particular local conditions and have only limited application. However, where they can be utilized, the heat pump installation may be simplified and in many cases where higher temperature sources are available, higher coefficients of performance may be obtained. In Switzerland, lakes and rivers have been used as the source of heat for large installations. Other installations have used individual water supplies, waste waters, and combination installations with industrial processes. Where such specialized sources are available, they frequently increase the range of application or performance. They do not, however, fit into the general heat pump problem. A modification of the earth as a heat source would include use of pipes under buildings or around basement walls to trap heat which is lost from the building. Limited quantities of such heat will be available at higher temperatures than heat from the ground.


Heat Capacity of Earth $Q=\frac{\pi d^2 L \rho c \Delta t}{4}$
where Q = Heat in Btu
d = Diameter in ft
L = Depth = 100 ft
ρ = Density = 90 lb per ft³
c = Specific Heat = 0.44 Btu per lb
Δt = Temperature Change = 10 F
Heat Capacity in Millions of Btu
Effective Diameter in ft
0
10
20
30
40
50
60
70
80
90
100
10 F
5 F
Thousands of Btu per hr
Air Volume in cfm
0
2000
4000
6000
8000
10,000
12,000
14,000
Approximate volumes of air required to provide different amounts of heat, with 5 and 10 deg temperature drops in the heat source, for an air-to-air pump
The heat capacity of cylinders of earth of various diameters, each cylinder 100 ft deep

T. E. Kennedy, Chief Project Engineer, Walter Kidde Constructors, Describes Carbon Dioxide Pipe Line Simplifying Industrial Process, Saving Man-Hours

PIPING—Industry's Best Transportation System

THERE'S A unique pipe line at Belleville, N.J. It runs from the measuring tanks of the Liquid Carbonic Corp.'s new plant into a huge storage tank and distributing system at Walter Kidde & Co., and through the pipe each day some 20,000 lb. of liquid carbon dioxide is pumped for use in fire extinguishers.



One of two 36 in. expansion loops that take care of expansion and contraction.

Practical and Economical

In 1944, Liquid Carbonic decided to build a plant in New Jersey. They wanted to be near Walter Kidde—one of their largest and most regular customers in the metropolitan area. In many respects, carbon dioxide is a seasonal product—as, for example, in the case of the beverage industry. However, for use in fire extinguishing equipment, there is little or no seasonal fluctuation. So proximity to Kidde was a primary consideration in the plans for the new building.

During the period of investigation by Liquid Carbonic and their contracting engineers (Walter Kidde Constructors, Inc., of New York) it was discovered that a suitable plant site was available adjoining the Kidde plant at Belleville. The possibility of using this site and pumping carbon dioxide directly to the consumer was at once seen to be both practical and economical. The pipe line was installed in the spring of 1946 after the Liquid Carbonic building had been completed.

Because the pipe carries a refrigerated, pressurized liquid, extra strong, black steel, 2 in. pipe with welded joints and fittings and capable of withstanding a pressure of 400 psi is used. The pipe is well insulated, since in everyday use the liquid carbon dioxide is subjected to normal temperatures after leaving the measuring tanks at the Liquid Carbonic plant at around —30 F.

All but an underground segment of the piping was insulated with a special brine cork (8.87 in. OD) wired with copper clad wire on 6 in. centers, and all voids were filled with an approved seam filler. In addition, all piping exposed to outside weather conditions was further insulated by a covering of two layers of 55 lb roofing felt, each layer thoroughly coated with hot asphaltum and the last layer securely bound on with copper wire on 12 in. centers. The underground piping was covered with only two layers of 55 lb roofing felt with each layer coated with hot asphaltum and the last layer bound with copper wire. The cork was left off this portion of the line because of the generally good insulation characteristics of the earth.

In the installation of the pipe line, it was necessary to go under a railroad track and siding which separates the two plants. Fortunately, an abandoned 14 in. steel pipe that had been used during the war as a steam main was already in the ground, so the 2 in. liquid

carbon dioxide pipe was inserted through this sleeve.

In the Liquid Carbonic Corp. plant, the piping was designed to run overhead, with a 90 deg bend, and set far enough away from the walls to allow ample space for expansion and contraction of the pipe. At the Kidde plant, the piping was also designed to run overhead, but the length of the pipe required two 36 in. radius expansion loops to take care of possible expansion and contraction. Also, three 600 lb sectional valves were installed to provide cutoffs in the event of a rupture at any point along the line.

In operation, the liquid carbon dioxide is weighed and then pumped through the pipe line to a 40,000 lb capacity refrigerated storage tank in the Kidde plant. From the storage tank, the carbon dioxide can be tapped as needed and put through two pumps to build up the pressure to about 1400 psi, which is the pressure required for filling steel fire extinguishing cylinders.

Saves Man-Hours

This is a simple operation compared with the previous method of delivering carbon dioxide. Formerly, the producing plant converted the liquid carbon dioxide into dry ice which was loaded on trucks and shipped to the consumer. The dry ice was then unloaded and stored in insulated storage bins, and, when needed, was put in converters and changed into its liquid form. Engineers at Walter Kidde & Co. estimate a saving of over 80 man-hours per week in the handling process alone, with the added benefit of a smoother operating supply procedure. From the viewpoint of the Liquid Carbonic Corp. there is also an anticipated saving in man-hours, in manufacturing, in handling and in shipping.

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Workers about to lower a section of the 2 in. pipe into the ground.

SPONSORS RESEARCH ON REFRIGERATION

In order to provide the results of research study and encourage "exceptional talent" to enter the refrigeration industry, the American Society of Refrigerating Engineers has, within the last three years, sponsored research in the field of refrigeration in the form of grants to recognized American engineering colleges. This plan as it now functions, includes the establishment of research fellowships for full time graduate students and "grants in aid" of modest sums (usually not over $500) to institutions for the support of specific research projects.

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IN THE October HPAC, page 91, "A.S.R." asked why it is better practice to take the branches off the side of the main instead of off the top in gravity hot water heating systems. He also asked why it is recommended that the pump be placed on the supply main rather than the return main in forced hot water heating systems wher the main is installed below the level of the boiler.

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Another consideration is that usually the branches are to be at the same level as the supply, and the supply is to be kept at the highest level possible, considering the grade and the possible need for draining the system; under such a condition, taking the branch off the top of the main would necessitate the use of extra fittings with their accompanying friction loss which would impede circulation in the system.

The reasons for putting the circulating pump in the supply main, rather than in the return, when the supply main is below the boiler level, are as follows:

Pump in Supply Main

1) In order to prevent damage to the pump in the event of flooding, the returns must be lifted above the return connection to the boiler. This will raise the pump sufficiently, but has the disadvantage of friction in the extra fittings necessary.

2) The normal tendency is for the hot water leaving the boiler to remain in the upper section of the supply main. With the pump in the supply main, the pump will directly overcome this normal tendency. With the pump in the return main, a considerable amount of the pump's head pressure will be lost in pumping the water into the boiler.

3) An equalizing line can be added to maintain equal suction head on the pump and to eliminate air in the return, before the return enters the boiler.

4) Due to the fact that water absorbs air at a rate increasing with pressure increase and decreasing with pressure decrease, and due to the accompanying fact that the head pressure in the boiler will be less with the pump in the supply, there will be a reduced possibility of an excess amount of air in the water leaving the boiler which would have to be vented at some other part of the system.

5) A less important point — but, nevertheless, to be considered—is the fact that less foreign material will enter the pump when it is in the supply, since most of it will be deposited in the boiler. Another minor point is that it becomes a simple matter to drain the system with the pump in the supply.—J.P.H.

IN ANY HOT water heating system the efficiency and operation of the system depends upon the circulation of the water. In a gravity system this circulation is set up by the change in the density of the water. The density of the cooler water being greater than that of the hotter water, it tends to drop to the bottom of the system. This in turn forces the hot water up, causing circulation to be set up within the system. Since this is the only force causing circulation the piping must be carefully laid out. Branches taken off the side of the mains give less resistance to flow and help to obtain a more uniform distribution of the fluid. There is less danger of creating air pockets in branches when taken from the side of the main.

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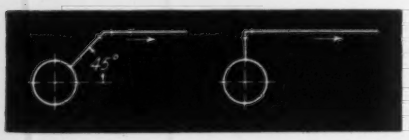
the centrifugal type with very little suction lift but good delivery head and they give better results when used as boosters. They usually operate at about 1750 rpm and can be placed on the return pipe but circulation is apt to be more sluggish. More satisfactory results will be obtained if the pump is placed on the supply.

On small systems with few radiators it will make very little difference whether the pump is on supply or return. It is on larger systems where the results are more noticeable.—S.R.H.

IN ANSWER TO "A.S.R.," it is better practice to take the branches off the side of the main instead of the top in gravity hot water heating systems because there is less friction loss in the former, as indicated by the sketch,



not to mention the more direct path of the fluid. As elbows are often an appreciable percentage of the total friction drop in the system, the 45 deg elbow has about 70 per cent of the friction drop of a 90 deg elbow.

The method of using a pump in the supply main is an accepted method when the heating medium is hot water supplied from a steam boiler. In this case the hot water take-off must be below the waterline. It is a necessity to have this take-off low and to follow the principle of locating the pump as close to the boiler as possible; it will therefore be on the supply side in the condition presented by "A.S.R."

The reason for locating the pump on the supply main rather than on the return main in forced hot water heating systems, when the main is installed below the level of the boiler, is to enable an air vent to be connected directly from the boiler inlet to the expansion tank. This could not be done if the pump were located on the return side. The connection of the pipe on the inlet enables air to escape to the tank before going through the boiler. This pump location follows the principle of having the suction side of the pump connected to the expansion tank, if of the open type, so that the head of the suction side of the pump will remain about the same throughout its operation.—R. R.

How to Care for Engine and Fan Bearings and Cylinders

By John G. Cronin

PROPER CARE of engine and fan bearings requires more than merely adding oil to bearing wells occasionally. At least once each year hang cans under each bearing well, drain plug and run off oil. Fill hand pump with kerosene, insert nozzle in filler plug opening and pump hard. After dirty kerosene has drained off give a few more strokes to flush out. Fill with clean oil, drain out this oil to remove kerosene, and refill to proper level with clean oil. If this is done regularly, the oil rings or chains will not fail to follow the revolving journal.

Engine shaft main and outboard bearings, when grease lubricated, should have old grease removed down to journals at regular intervals and be repacked with new grease. Adding grease over long periods covers up and pushes the old caked grease down to journals and leads to trouble.

The gravity, sightfeed lubricating devices used for feeding oil to steam engine bearings are among the most satisfactory and dependable oiling systems. They need only to be kept clean *internally* and filled with clean oil to give fine results.

It is not good practice to cut the number of drops per minute to the very minimum to save oil, as the opening at the regulating valve is then so fine that it can easily become clogged.

Do not use cotton waste to wipe around the centered oil hole in crankpin centrifugal oiler arm — bits of waste getting into the arm can obstruct the small drilled holes in crankpin.

A steam engine with all parts in proper alignment will operate smoothly and with very little wear when good oil is used.

Changing over to grease to cushion pounding is the wrong procedure — have repairs or adjustments made as needed and stick to oil lubrication.

From Scotty-Grams, a publication of the Chicago Board of Education, of which John Howatt, member of HPAC's board of consulting and contributing editors, is chief engineer and business manager.

There is just one bearing where grease may be used to advantage — the outboard or pedestal bearing — and in some cases the pins on rocker arms.

Dry out engine and pump steam cylinders and coat with cylinder oil and graphite after the last heating day in the spring — do not let them stand wet with condensation after closing down for the season.

Engines should be turned over by hand at intervals when shut down to prevent rust formation on polished surfaces of cylinders. It would be well to move pump pistons also where possible for the same reason.

When oiling engines and pumps for lay up be certain that plenty of oil is worked around slide and piston valves and seats and around steam valves and auxiliary pistons in pump steam chests.

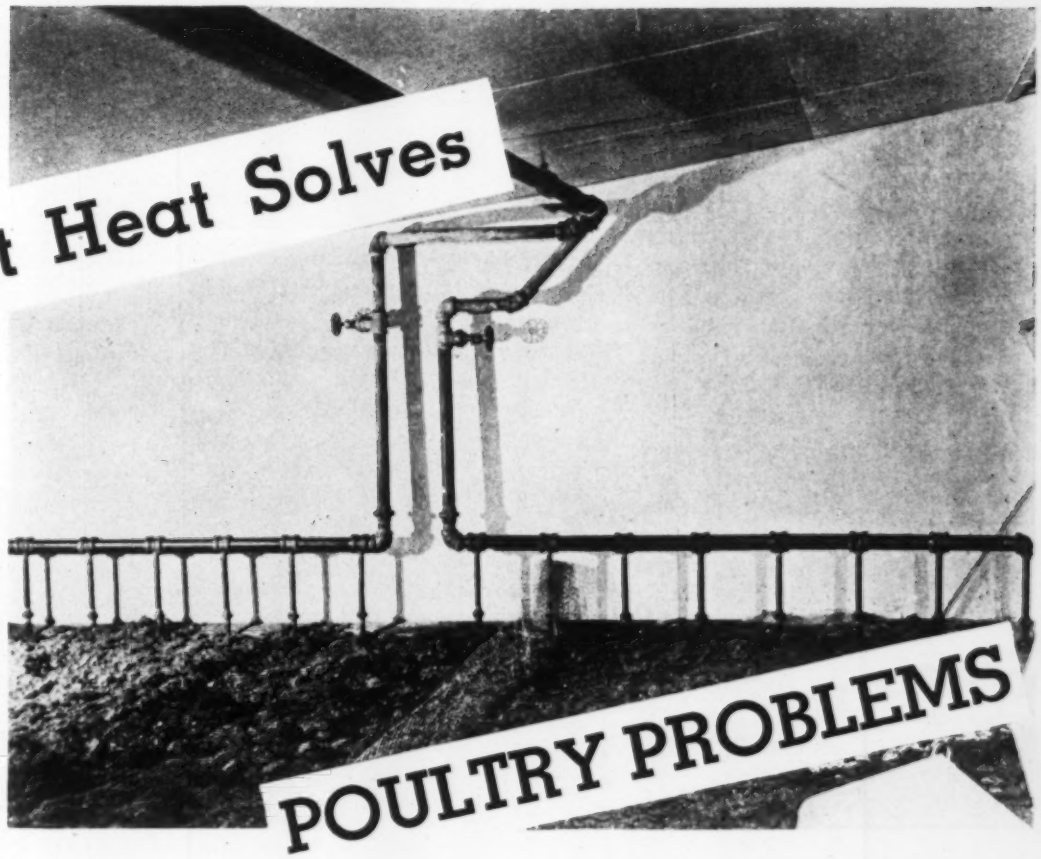
Remove all packing from steam piston and valve rods immediately after last running to prevent rust and pitting from moisture in packing. Oil rods thoroughly.

Solar Heat

EFFECTIVE USE of the sun's heat for space heating has been brought closer to realization as a result of wartime research sponsored by the WPB's office of production research and development, according to a report on sale by the Office of Technical Services. The 154 page report describes the construction and operation of two solar heat collectors developed at the Engineering Experiment Station of Colorado, Boulder.

Orders for the report (*Solar Energy Utilization for House Heating*, PB-25375; mimeograph, with offset illustrations, $1.50; 154 pages) should be addressed to the Office of Technical Services, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order payable to the Treasurer of the United States.

Radiant Heat Solves POULTRY PROBLEMS



The 1 in. grid pipes are spaced 1 ft apart and are connected at one end to a 2 in. header pipe that forms the return main to the boiler. The hot water supply main runs overhead through the brooder houses to another header above the floor. This is done so that water can circulate by gravity if the electric supply to the hot water circulating pump fails.

Weight of Birds Up, Mortality Down, Lower Fuel, Labor, and Material Costs Are Advantages Found by Crown Poultry

Concealed radiant heat has proved to be the answer for many of the problems involved in raising poultry. One chicken farmer, C. D. Tsantes, president of the Crown Poultry Co., Port Jefferson, Long Island, has reported impressive economies and increased profits through its use in two large brooder houses on his farm.

Drafts and dampness are responsible for a large percentage of mortality rates among poultry and cause many of the diseases of poultry. At least two state universities are conducting experiments with radiant heat and the experiences of Mr. Tsantes indicate that it has vast possibilities in the poultry raising industry.

On New Year's Day, 1945, a windstorm swept across Long Island, picked up the brooder houses on the Crown poultry farm and deposited them, a pile of kindling wood, in a ravine about 50 ft away. Faced with the necessity of rebuilding the farm, Mr. Tsantes and his two sons, who help him operate the farm, visited D. J. Hall, a heating engineer at Patchogue, who suggested that the new brooder houses be equipped with radiant heat.

At the Crown farm, day-old chicks are purchased in lots of from 4500 to 5000. They are kept indoors for 12 weeks, then dressed and sold to New York commission houses for the diningrooms of hotels and restaurants. The annual production of the farm is about 25,000 chickens.

Two new brooder houses were built by Mr. Tsantes. One is 200 ft long; the other, 135 ft. Both are 20 ft wide and average about 6½ ft in height, being built with roofs that slope from 8 to 5 ft. They are constructed of 2 in. x 4 in. studs, with tongue and grooved wood sheathing. The outside is covered with tar roofing paper and the interior is finished with ¼ in. asbestos-cement wallboard. Walls and ceiling are insulated with rock wool batts, 3⅝ in. thick.

To install the radiant heating system, a grid of 1 in. wrought iron pipe was run the entire length of the floor of each house. The grid pipes were spaced 1 ft apart and, at one end, were connected to a 2 in. header pipe that forms the return main to the boiler. The hot water supply main runs from the boiler room overhead through the brooder houses to another header pipe above the floor. This is done so that the water can circulate by gravity if the electrical power supply to the regularly used circulating pump fails. From the supply header, 1 in. pipes drop down into the concrete floor and are connected to the buried pipes. The floor is 4 in. thick and rests on 4 in. of gravel. The pipes are about 2 in. below the floor surface.

The longer brooder house is divided into nine separate enclos-

ures each 20 ft square, with 4 in. partitions comprising 2 x 4 studs with ¼ in. rockboard on each side. The shorter house has six pens.

When the chicks are first moved into the brooder houses, the temperature is kept at about 90 deg. Gradually it is reduced until during the last four weeks of the growing cycle it is about 75 deg. A wall thermostat is used in each house to regulate the temperature. The radiant system is kept in operation 24 hr daily the year 'round.

Since radiant heat has been used, Mr. Tsantes reports, the average weight of the 12 week-old birds he ships has increased from 3½ to 4½ lb. The mortality rate of the chicks has decreased to about 1 per cent instead of the average loss of about 15 per cent. Fuel costs with a stoker fired coal boiler were approximately $1650 less than the cost of the hand-fired open coal stoves previously used!

With the old stoves, it was necessary to change the peat moss floor litter every two weeks—with the new heating system, it is necessary to change the litter (cane sugar) only four times a year. This is a saving of $4284 in material alone, not including labor required to move the litter.

Mr. Tsantes estimates that annual savings in fuel, material, and labor costs amount to more than $11,000. Add this figure to the amount realized from the increased shipping weight of the birds and it becomes apparent that the investment of $2600 in a radiant heating system was a wise one.

He states further that the fire insurance rates on the brooder houses have been reduced about 33 per cent because the fire hazards involved in the use of open stoves have been eliminated.

Mr. Tsantes reports that poultry experts from Cornell University's agriculture department inspected the first lot of chicks raised in radiant heat and pronounced them extremely healthy and well developed. These experts predicted that radiant heat will develop chicks faster for market use, he says, adding that he already knows this prediction has come true because of his own experience.

MAJOR CITY SMOKE FROM BIG USERS

"Perhaps we can now settle down to a sane and comprehensive smoke abatement program in many of our American cities," said R. E. Howe, chairman of the Coal Producers Committee for Smoke Abatement, after being shown a statement by Dr. Clarence Mills, professor of experimental medicine at the University of Cincinnati. The statement, published in the Journal of the Cincinnati Academy of Medicine, said that studies had shown that the major portion of the smoke in our cities comes from the railroads, factories, and large buildings and not from the domestic consumer.

"Dr. Mills apparently has used his own system of determining a fact which the Coal Producers Committee for Smoke Abatement has insisted must be understood before the smoke problem could be approached with anything resembling realism," Mr. Howe said. "We have always insisted that only a very small part of the smoke in the atmosphere over our cities could be traced to the domestic consumer—in many cities not more than 10 per cent.

"Now that Dr. Mills has virtually confirmed our findings, it must be obvious to all why the Coal Producers Committee could not subscribe to the theory held in some quarters that all that was necessary to clean the skies over our cities was to pass a law compelling consumers of coal in handfired operations to burn only low volatile coal," Mr. Howe continued. "It now becomes clear that even if we banned all use of coal in the homes the reduction in the atmospheric pollution would be so small as to go unnoticed."

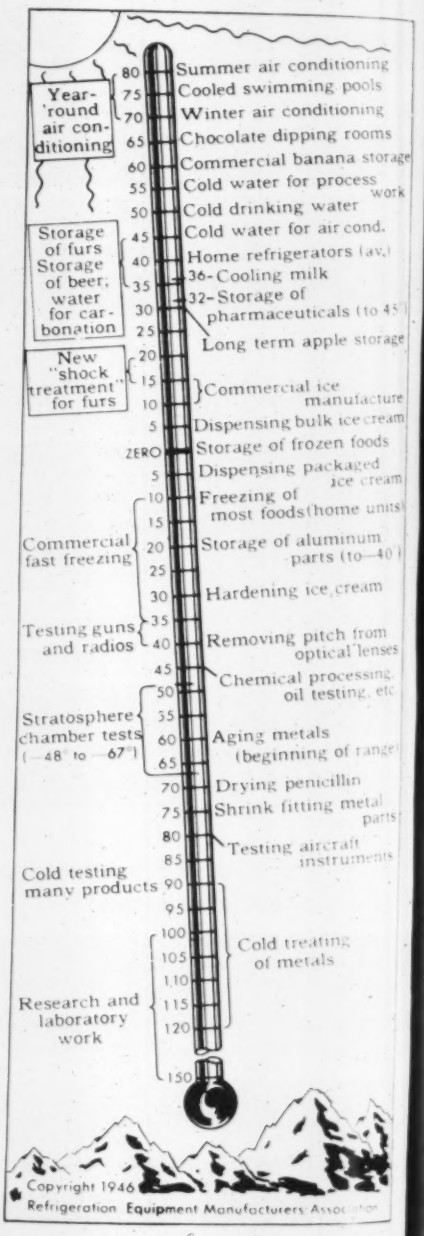
REFRIGERATION USES SHOWN ON NEW CHART

That present-day uses of mechanical refrigeration extend nearly twice as far below the zero-mark on the thermometer as they do in above-zero calibrations is little known to the average individual who regards 80 above as "pretty hot" and 10 below as "pretty cold."

In a recent survey of the services now performed by mechanical refrigeration and air conditioning, the Refrigeration Equipment Manufacturers Association listed more than 200 uses, ranging from air conditioning for human comfort in the above-zero brackets, to the 65 F above to 36 F below span used in various food preservation and processing, on down to the sub-zero temperatures of 90 to 150 below used in the cold treating of metals and in research work.

Typical uses in the entire 230 deg range are shown in a new "all-industry" thermometer prepared by REMA with the cooperation of refrigeration and air conditioning engineers. Equipment to perform the multiplicity of tasks shown now is in production in hundreds of factories throughout the country.

"All-industry" thermometer chart



Heating, Piping & Air Conditioning

Show Section

Cleveland

January 27-31

7th International Heating, Ventilating, and Air Conditioning Exposition . . . 53rd Annual Meeting of the American Society of Heating and Ventilating Engineers . . . 33rd Convention National Warm Air Heating and Air Conditioning Association

Lakeside Hall is the scene of the 7th International Heating, Ventilating and Air Conditioning Exposition

Many Activities Planned

CLEVELAND WILL be headquarters for all interested in heating, ventilating, and air conditioning during the week of January 27-31, when the 7th International Heating, Ventilating, and Air Conditioning Exposition will be presented at Lakeside Hall, the 53rd annual meeting of the American Society of Heating and Ventilating Engineers will convene at the Hotel Statler, and the 33rd annual convention of the National Warm Air Heating and Air Conditioning Association will be held—on two of the days, January 29 and 30—at the Hotel Cleveland.

This special Show Section has been assembled as a service to the readers of Heating, Piping & Air Conditioning—thousands of whom are expected to attend the Cleveland events—to give complete information on the exhibitors at the exposition, the products to be displayed, names of those in attendance at the booths, the meeting programs of the two associations, and other items of interest. Those who will be in Cleveland will find these listings of help in advance planning of their time there; those who cannot attend the exposition and the other affairs will want to check over the descriptions of the products to be exhibited to be up-to-date on 1947's heating, ventilating, and air conditioning equipment.

Events for ASHVE members will commence on January 26 when a series of committee meetings will be held at Hotel Statler and at the Society's research laboratory, 7218 Euclid Ave. On Monday the opening session will be held at the laboratory and special dedication ceremonies will be conducted to commemorate the official opening of the laboratory in the Society's own building.

At the first session reports of officers and committees will be given, as well as a laboratory paper on the subject of air flow into suction openings. Following the first session there will be an informal luncheon at nearby Quad Hall.

The second session will be held at the Hotel Statler on Tuesday morning, January 28, and papers on dehumidification, and on the effect of moisture content on the diffusion of odors will be given.

During the afternoon a forum on panel and radiant heating will be conducted and because of the popularity of the subject a heavy attendance at this session is anticipated.

The technical session on Wednesday morning at the Hotel Statler will be devoted to atmospheric environment and health hazards and during the afternoon several inspection trips have been arranged by the local chapter.

A technical session on Thursday morning, January 30, at the Hotel Statler will conclude with the installation of the new officers.

During the afternoon a joint session with the National Warm Air Heating and Air Conditioning Association will be held.

From the response of ASHVE members who plan to attend the annual meeting, it is evident that the housing problem in Cleveland will be difficult, but the hotels are cooperating with the housing bureau of the Cleveland Convention and Visitors' Bureau to take care of requests for rooms. Transportation arrangements should be made at least a month in advance and it is recommended that return reservations be secured when purchasing tickets.

The committee on arrangements of the ASHVE's Northern Ohio chapter is under the general chairmanship

of D. L. Taze, with L. T. Avery, C. F. Eveleth, and G. L. Tuve as honorary chairmen. The vice chairmen are E. B. Cary, P. D. Gayman, F. A. Kitchen, and L. S. Ries and the secretary is J. M. Black. The following subcommittees are handling the various activities:

Banquet—John James, *Chairman;* Walter Baggaley, *Vice-Chairman;* R. W. Dickson, Jr., D. Gladieux, D. E. Mannen, E. W. Philips.

Entertainment—R. L. Clark, *Chairman,* S. R. Guilbert, E. E. Maurer, L. H. Pogalies, E. J. Sable, W. B. Watterson, R. A. Wilson.

Finance—E. F. Morse, *Chairman;* H. W. Heisterkamp, J. F. Platz, J. A. Schurman, A. L. Vanderhoof.

Inspection—L. G. Powers, *Chairman;* W. M. Rowe, *Vice-Chairman;* K. A. Gottschalk, L. H. Jackett, W. P. Miller.

Laboratory Reception—C. M. Humphreys, *Chairman;* R. M. Conner, G. V. Parmelee, J. J. LaSalvia, R. F. Stamberger.

Ladies—R. H. Cutting, *Chairman;* Mrs. R. H. Cutting, Mrs. L. T. Avery, Mrs. P. D. Gayman, Mrs. C. M. Humphreys, Mr. and Mrs. J. P. Jones, Mr. and Mrs. W. R. Rhoton, Mrs. L. S. Ries, Mrs. Cyril Tasker, Mrs. G. L. Tuve.

Publicity—W. R. Moore, *Chairman;* J. A. Dahlstrom, K. T. Davis, W. E. Eynon, Alexander Galaba, B. L. Gamble, R. A. Jack, John Richmond.

Reception—J. E. Wilhelm, *Chairman;* G. P. Nachman, *Vice-Chairman;* J. L. Foley, J. L. Frisse, C. L. Grandstaff, H. L. Repp, W. R. Rhoton, L. E. Slawson, H. E. Wetzell, H. K. Jennings (Cincinnati Chapter), R. B. Breneman (Central Ohio Chapter).

Sessions—R. L. Byers, *Chairman;* E. E. Maurer, *Vice-Chairman;* P. M. Berry, J. C. Boehm, Jr., L. C. Burkes, H. F. Curtis, T. D. Dravage, J. K. Kinkaid, A. E. Lavelle, H. A. Tolerton.

Transportation—R. E. Sherman, *Chairman;* L. W. Dunbar, P. B. Fleming, J. A. Hall, C. A. McKeeman, C. R. Matthews.

Social activities of the ASHVE gathering commence with an informal luncheon after the opening session. There will be an opportunity for some inspection trips on Monday afternoon following the luncheon. On Monday evening an informal party and entertainment is planned and an announcement about this will go to members by mail.

On Tuesday afternoon a social hour at the Hotel Statler is planned at 5:30 p.m. and the past presidents' annual dinner will be held on that same evening.

The climax to the social functions will be the annual banquet on Wednesday evening at 7:00 p.m. at the Hotel Statler.

The chapter delegates will hold two meetings, one on Monday at 2:30 at the Research Laboratory, and the second on Wednesday at 2:00 p.m. in the Lattice Room of the Hotel Statler.

The committee on research will meet during the annual meeting and two meetings of the council will be held. The new council will organize at a meeting at 4:00 p.m. on Thursday, January 30.

A special program for ladies who attend is being planned by an active ladies committee.

"For the first time in the entire history of the nation's warm air heating industry there are a number of vital new developments which will insure the future success of all segments of the industry," Frank E. Mehrings, president of the National Warm Air Heating and Air Conditioning Association, has announced, and these new developments will be presented at the convention of the association on January 29 and 30 at the Hotel Cleveland.

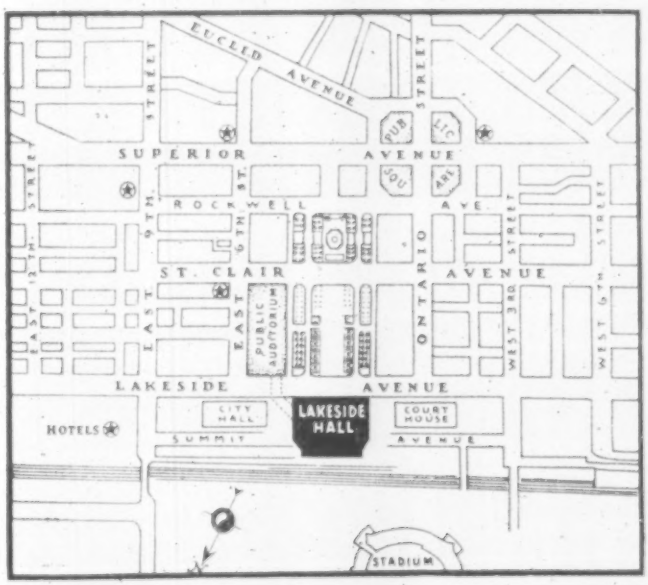
The new developments will be of unusually great interest to warm air heating dealers because they will increase the dealer sales volume and profits in the buyers' market which appears to be just around the corner, according to Mr. Mehrings.

Numerous new dealer promotional helps will be presented by J. R. Scott, chairman of the association's publicity and merchandising committee. Under the chairmanship of Mr. Scott there will be presented by E. L. Sylvester, vice president of Florez, Inc., an outline of "indoor comfort conferences" being scheduled for 1947. This brand new kind of a training program will include two new sound slidefilms developed for the conferences. There will be sample demonstrations of how the charts, visual cast slides and other visual aids are utilized in dealer training. The objective of the conferences, which last for two days, is to bring about improved installation and operation of indoor comfort systems.

Allen W. Rucker, president and founder of the Tool Owners Union, will be the guest speaker at the luncheon on the opening day, January 29. Tools, according to Mr. Rucker's definition, are the machinery, buildings and equipment made available to the "tool users" (the workers) by the "tool owners" (the investors).

George Boeddener is managing director of the National Warm Air Heating and Air Conditioning Association.

The exposition hall is conveniently situated



PROGRAM 53rd ANNUAL MEETING HOTEL STATLER, 1947

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS

Sunday, January 26

10:00 a.m. Committee Meetings
1:00 p.m. Registration (Hotel Statler)
1:30 p.m. Council Meeting
2:00 p.m. Committee Meetings

Monday, January 27

8:30 a.m. Registration (Hotel Statler)
10:00 a.m. FIRST SESSION (Research Laboratory)
- Dedication of Research Laboratory
- Reports of Officers
- Air Flow into Suction Openings, by A. D. Brandt and R. J. Steffy
- Reports of Committees
- Report of Tellers of Election

12:15 p.m. Research Luncheon (Quad Hall)
2:00 p.m. Opening of Exposition (Lakeside Hall)
2:30 p.m. Chapter Delegates Meeting (Research Laboratory)
3:00 p.m. Inspection Trips
9:30 p.m. Informal Party and Entertainment

Tuesday, January 28

8:30 a.m. Registration (Hotel Statler)
9:30 a.m. Technical Session (Hotel Statler Grand Ballroom)
- The Effect of Moisture Content on the Diffusion of Odors in Air, by Richard L. Kuehner
- Dehumidification—Methods and Applications, by John Everetts, Jr.
- Rating Dynamic Dehumidification Equipment, by E. R. Queer and E. R. McLaughlin

Alfred J. Offner, ASHVE's President

B. M. Woods, 1st Vice President of ASHVE

12:00 noon Exposition (Lakeside Hall)
2:00 p.m. Panel and Radiant Heating Forum
5:30 p.m. Social Hour (Hotel Statler Pine and Euclid Ballroom)
6:30 p.m. Past Presidents' Dinner (Hotel Statler Tavern Room)

Wednesday, January 29

8:30 a.m. Registration (Hotel Statler)
9:30 a.m. Technical Session (Hotel Statler Grand Ballroom)
- Practical Considerations in Determining Human Tolerance to Heat, by Willard Machle, M.D.
- Methods Used in Determining Health Hazards Arising from the Inhalation of Various Chemicals, by F. F. Heyroth
- Minimum Replenishment of Air for Living Spaces Under Conditions of Mechanical Cooling, by W. V. Consolazio

12:00 noon Exposition (Lakeside Hall)
1:30 p.m. Inspection Trips
2:00 p.m. Chapter Delegates Meeting (Hotel Statler Lattice Room)
7:00 p.m. Annual Banquet
- Toastmaster: L. T. Avery
- Presentation of Past President's Emblem

Thursday, January 30

9:30 a.m. Technical Session (Hotel Statler Euclid Ballroom)
- Response and Lag in the Control of Panel Heating Systems, by F. W. Hutchinson
- Unfinished Business
- New Business
- Installation of Officers

12:00 noon Exposition (Lakeside Hall)
2:30 p.m. Joint Session with National Warm Air Heating and Air Conditioning Association
- Proposed Design Procedure for Large Mechanical Warm Air Heating Systems by Prof. S. Konzo
- Bacterial Air Sampling, by Matthew Luckiesh and A. H. Taylor

4:00 p.m. Council Meeting

PROGRAM 33rd CONVENTION HOTEL CLEVELAND

NATIONAL WARM AIR HEATING & AIR CONDITIONING ASSOCIATION

Wednesday, January 29

9:00 a.m. Registration (Hotel Cleveland)

10:00 a.m. On the Threshold of Opportunity, by Frank E. Mehrings, President

10:30 a.m. Foreman . . . Management. Team Mates or Bargaining Units, by H. J. Post, The National Association of Foremen

11:00 a.m. Our New Research Residence, Frank L. Meyer, Chairman, Research Advisory Committee

11:15 a.m. What the Indoor Comfort Program Means to Dealers, by Hugh Thompson, Chairman, Dealers Committee

11:30 a.m. What the Association Is Doing for Wholesalers and Distributors, by A. M. Vorys, Chairman, Jobbers Committee

11:45 a.m. Election of Officers and Members of the Board of Directors

12:30 p.m. Luncheon Session (Admission by ticket)
Guest Speaker: Allen W. Rucker, President, Tool Owners Union

2:15 p.m. Results of Publicity, Merchandising and Educational Activities, by J. R. Scott, Chairman, Publicity and Merchandising Committee

Publicity and Promotion, by E. R. Preble, Vice President, Griswold-Eshleman Co.

Demonstration of Indoor Comfort Conferences for Dealers, by E. L. Sylvester, Vice President, Florez, Inc.

How to Plan for Indoor Comfort Conferences, by G. A. Voorhees, Application Engineering Director

Summarization, by F. E. Mehrings, President, and J. R. Scott, Chairman

Thursday, January 30

9:30 a.m. New Warm Air Research Residence, by R. W. Roose, Special Research Assistant, University of Illinois

10:00 a.m. Furnace Blower Research—A New Investigation, by N. A. Buckley, Special Research Assistant, University of Illinois

10:30 a.m. Resistance of Branch Take-Off Fittings in Extended Plenum, by S. Konzo, Special Research Professor, University of Illinois

11:15 a.m. Committee Reports by F. L. Meyer, Chairman, Research Advisory Committee; W. D. Redrup, Chairman, Installation Codes Committee; Prof. L. G. Miller, Chairman, Technical Education Committee; Guy A. Voorhees, Application Engineering Director

2:30 p.m. Joint session with American Society of Heating and Ventilating Engineers

Proposed Design Procedure for Large Mechanical Warm Air Heating Systems, by Prof. S. Konzo

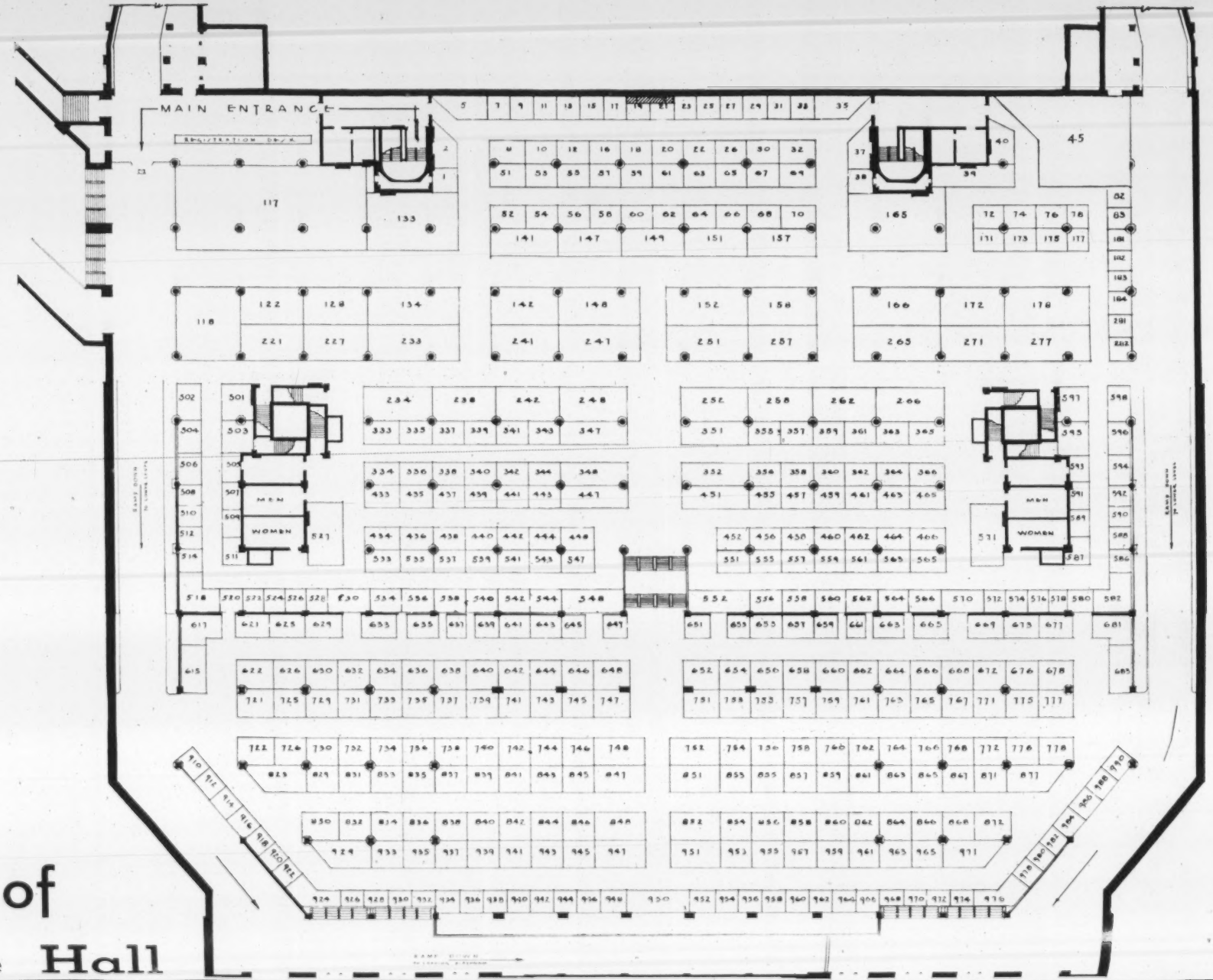
Bacterial Air Sampling, by Matthew Luckiesh and A. H. Taylor

The ASHVE will meet at the Hotel Statler

The NWAHACA will gather at the Hotel Cleveland

Frank E. Mehrings is President of NWAHACA

George Boeddener, Managing Director



Plan of Lakeside Hall

EXPOSITION EXHIBITORS AND THEIR EXHIBITS

LISTED below are the names of the exhibitors who are scheduled for the Seventh International Heating and Ventilating Exposition, per latest advice at press time from the exposition management. Those listed with information on the products they will exhibit and the names of representatives who will be in attendance furnished these details direct to Heating, Piping & Air Conditioning. With the booth numbers and the accompanying diagram of the exhibit hall, the location of each exhibitor can be quickly spotted.

The exposition is under the management of the International Exposition Co., Charles F. Roth, manager.

ACE ENGINEERING CO., 1435 W. 15th St., Chicago 8, Ill.—Booth 22.

In attendance: L. C. Ericks, I. L. Schurman, J. W. Cowan.

Exhibiting: Industrial horizontal rotary oil burners.

ACME INDUSTRIES, INC., Jackson, Mich. —Booth 663.

In attendance: J. T. Maloney, K. A. Weatherwas, E. B. Dunphy, J. M. Craun, Paul Blanchard.

Exhibiting: Evaporative condenser of new design embodying features to make unit readily accessible and as free from service problems as possible; "Dry-Ex" water cooler for direct expansion of refrigerant in the tubes and chilling of fluids through the shell; line of shell and coil heat exchangers, with cut-a-way sections.

ADAMS MFG. CO., 11226 Superior Ave., Cleveland 6, Ohio—Booth 843.

In attendance: A. S. Katz, H. F. Wilson, J. A. Morse.

Exhibiting: Conversion gas burner in operation; gun type burner.

AEROFIN CORP., 410 S. Geddes St., Syracuse, N. Y.—Booth 271.

In attendance: M. Noble, A. E. Williams, L. A. Childs, G. F. H. Regan, George W. Barr, Walter E. Heibel, G. Donald Fife, A. S. Ammerman, George H. Cummins, L. C. McClanahan, Jim C. Chase.

Exhibiting: Heating and cooling coils representative of standard production items.

AIR CONDITIONING ASS'N OF CUYAHOGA COUNTY, 1906 Euclid Ave., Cleveland 15, Ohio—Booth 508.

AIR CONDITIONING & OIL HEAT, 232 Madison Ave., New York 16, N. Y.—Booth 547.

Exhibiting: Publication.

AIR CONDITIONING & REFRIGERATION NEWS, 450 W. Fort St., Detroit 26, Mich.—Booth 976.

Exhibiting: Publication.

AIR CONTROL PRODUCTS, INC., Coopersville, Mich.—Booths 1 & 2.

Exhibiting: Air conditioning registers and grilles; gravity registers; floor registers and faces; attic and roof ventilators; frames; damper control sets; "Leigh" line of building products.

AIR CONTROLS, INC., Div. of Cleveland Heater Co., 2310 Superior Ave., Cleveland 14, Ohio—Booth 262.

In attendance: B. G. Krause, J. A. Brainard, G. L. Schwarz.

Exhibiting: Furnace blowers; blower filter units; exhaust, window, and attic fans.

AIR DEVICES, INC., 17 E. 42nd St., New York 17, N .Y.—Booths 5, 7, 9.

In attendance: C. N. O'Day, G. J. Sweeney, R. W. Christie, C. A. Eades, W. F. Schroeder, T. A. Hughes.

Exhibiting: "Agitair" products; permanent, cleanable, high velocity, all metal air filters; square, rectangular, and circular air diffusers; wind actuated exhausters; direct fired, hot gas generating, industrial furnaces.

AIR-MAZE CORP., 5200 Harvard Ave., Cleveland, Ohio—Booths 67-69.

In attendance: R. A. Behlen, N. L. Lamprecht, Jack Thomas, W. B. Watterson.

Exhibiting: "Greastop" filters; air filters.

AIRTEMP DIV., CHRYSLER CORP., 1119 Leo St., Dayton 1, Ohio—Booths 72-74-76-78.

In attendance: D. W. Russell, H. A. Malcom, I. C. Baker, C. R. Mougey, W. C. Bartels, W. B. Shirley, A. F. Ward, M. R. Bard, J. J. Donovan.

Exhibiting: Packaged air conditioner with wrap around case; standard packaged air conditioner; packaged air conditioner with plate glass windows; room cooler; sealed radial compressor cutaway demonstrator; residential year-round air conditioner in operation; "Thrift Model" oil fired furnace; floor furnace; gas fired furnace; oil fired steel boiler; domestic bituminous stoker; oil fired water heater; reach-in refrigerator; ¼ hp sealed condensing unit; pressure water cooler; packaged condensing unit.

AIRTHERM MFG. CO., 700 S. Spring Ave., St. Louis 10, Mo.—Booth 635.

In attendance: F. P. Kohlbry, N. B. Barsha, J. C. Watkins.

Exhibiting: Unit heaters; direct fired warm air heaters.

ALDRICH CO., Wyoming, Ill.—Booths 12 & 16.

In attendance: Mr. and Mrs. L. I. Aldrich, Carl O. Staley, E. L. Fox, Jas. T. Ash, R. B. Barber.

Exhibiting: Boiler burner units; oil burners.

ALLIS-CHALMERS MFG. CO., Milwaukee 1, Wis.—Booths 722 & 726.

In attendance: O. P. Donohue, B. J. Verhaalen, H. D. Blake.

Exhibiting: Motors, pumps, "Texrope" drives, welding equipment.

AMERICAN AIR FILTER CO., INC., Louisville, Ky.—Booths 929-933-935.

In attendance: John Hellstrom, H. W. Pound, H. C. Murphy, A. C. Lewis, Jr., J. R. McConnell, Wm. Gabbert, John Kane, W. K. Minor.

Exhibiting: "Electro-Matic," "Electro-Cell," and "Electro-Airmat" electronic precipitators; "Electro-Klean" electronic home filter; three "Roto-Clone" types; special "Electro-Airmat" demonstrating unit showing removal of tobacco smoke; "Electro-Klean" automatic selfcleaning precipitator in warm air heating system in operation; "Roto-Clone" lucite demonstrating model.

AMERICAN ARTISAN, 6 N. Michigan Ave., Chicago 2, Ill.—Booth 552.

In attendance: Frank P. Keeney, Chas. E. Price, J. D. Wilder, Wallace J. Osborn, Robert A. Jack, James D. Thomas, George C. Cutler, Ralph M. Jepsen.

Exhibiting: Publication, technical books and market data.

AMERICAN BRASS CO., Waterbury 88, Conn.—Booth 227.

AMERICAN FLANGE & MFG. CO., INC., 30 Rockefeller Plaza, New York 20, N. Y.—Booths 837-839.

In attendance: Messrs. Akers, Hughes, Hummett.

Exhibiting: "Ferro-Therm" steel insulation.

AMERICAN GAS ASSOCIATION, 420 Lexington Ave., New York 17, N. Y.—Booths 555-557-559-561.

In attendance: Clifford E. Hall.

Exhibiting: Conversion burners, furnaces, water heaters, and air conditioning units of different manufacturers.

AMERICAN METAL HOSE BRANCH, AMERICAN BRASS CO., Waterbury 88, Conn.—Booth 271.

AMERICAN RADIATOR & STANDARD SANITARY CORP., P. O. Box 1226, Pittsburgh 30, Pa.—Booth 117.

Exhibiting: "Severn" boiler for all fuels; "Mohawk" gas fired winter air conditioner; "Empire" gas boiler for steam or hot water; "Budget" gas fired storage water heater; "Arcoliner" wet base boiler oil fired; "Exbrook" steam boiler, stoker model; "Oakmont" oil heating unit for steam or hot water; "Standard" gas boiler for steam or hot water; "Westmoreland" winter air conditioner, oil fired; "Allerton" winter air conditioner; "Seneca" gas fired winter air conditioner; "Shawnee" gas fired furnace; "Arlington Square" warm air furnace; "Sunrad" and "Arco" radiators; "Arco" cast iron convector with enclosure; "Arco Multifin" convector with enclosure; "Arcoflame" oil burners; heating accessories panel; cutaway views by translite for the "Severn," "Mohawk," "Empire," and the "Oakmont" oil heating unit.

AMERICAN SHIP BUILDING CO., DELTA SHIP BUILDING DIV., Cleveland 13, Ohio —Booth 986.

AMERICAN SOCIETY OF HEATING & VENTILATING ENGINEERS, 51 Madison Ave., New York 10, N. Y.—Booth 505.

Exhibiting: Association.

AMERICAN SOCIETY OF REFRIGERATING ENGINEERS, 40 W. 40th St., New York 18, N.Y.—Booth 572-574.

Exhibiting: Association.

AMERICAN STOVE CO., Lorain Div., 1200 Long Ave., Lorain, Ohio—Booth 234.

In attendance: C. B. Tozer, J. M. Bayer, W. F. Jackson, C. L. Wessel, T. M. Sourbeck.

Exhibiting: Oil burning furnaces, vaporizing type, for GI home construction, including 55,000 Btu gravity model, 60,000 Btu model with booster fan, and 65,000 Btu model with blower.

ANDERSON CO., V. D., 1935 W. 96th St., Cleveland, Ohio—Booth 177.

In attendance: C. W. Zies, W. J. Gleason, D. H. Sinclair, Geo. J. Schumacker.

Exhibiting: Steam traps; pipe line strainers.

ANEMOSTAT CORP. OF AMERICA, 10 E. 39th St., New York 16, N. Y.—Booth 165.

In attendance: F. J. Kurth, J. B. Hewett, V. Floyd Self, F. Honerkamp.

Exhibiting: Draftless air diffusers, ceiling and wall types; air diffusers in combination with lighting fixtures; actual units in operation for demonstration purposes.

APRIL SHOWERS, INC., 43 E. Green St., Pasadena 1, Calif.—Booth 645.

ARMSTRONG MACHINE WORKS, Three Rivers, Mich.—Booth 11.

In attendance: O. E. Ulrich, Paul Wheeler, T. H. Rea, H. W. Mosher, Hubert Hunt.

Exhibiting: Steam traps, humidifiers, air traps, foul gas purgers for compression type refrigeration systems.

AUER REGISTER CO., 3608 Payne Ave., Cleveland, Ohio.—Booth 647.

In attendance: Geo. Metzger, H. F. Curtis, R. E. Brumbaugh, F. A. Hancock.

Exhibiting: Warm air and air conditioning registers and grilles; ornamental grilles; metal clothes chute doors.

AU-TEMP-CO. CORP., 521 5th Ave., New York, N. Y.—Booth 980.

In attendance: Messrs. Herske, Timmis, Fowler, Whittet.

Exhibiting: Electronic indoor-outdoor weather controls; motorized valves; radiant heat controls.

AUTOMATIC DEVICES CO., 53 W. Jackson Blvd., Chicago 4, Ill—Booth 625.

In attendance: H. T. Kucera, W. G. Pennington, L. Moray, W. W. Thompson, W. H. Bunten, F. C. Lenihan, E. M. Clary.

Exhibiting: "Weather-Man" automatic regulator for controlling building temperature from outside.

AUTOMATIC FIRING CORP., 6504 Olive Blvd., St. Louis 5, Mo.—Booths 30-32.

In attendance: Hugo Wurdack, Sidney Strauss, Roy F. Graham, James J. Lee, Bernard Baumstein, Paul Oehler, A. L. Smith, Ernst A. Kuhn.

Exhibiting: "Stok-A-Fire" stokers; "Gas-A-Fire" conversion burners and furnaces; "Oil-A-Fire" products.

AUTOMATIC HUMIDIFIER CO., Cedar Falls, Iowa—Booth 343.

In attendance: J. W. Galloway, R. M. Galloway, W. E. Simpson.

Exhibiting: Humidifiers.

AUTOMATIC PRODUCTS CO., 2446 W. 32nd St., Milwaukee, Wis.—Booths 540-542.

AVERY ENGINEERING CO., 1906 Euclid Ave., Cleveland 15, Ohio—Booth 640.

In attendance: C. J. Leonard, Lester T. Avery, Joe E. Wilhelm.

Exhibiting: Air conditioning equipment; "Kool-Shade" sun screen.

BACHARACH INDUSTRIAL INSTRUMENT CO., 7000 Bennett St., Pittsburgh 8, Pa.—Booth 184.

In attendance: B. H. Nunnally.

Exhibiting: Service instruments for air temperature and motor operation records, stack draft, carbon dioxide, and temperature.

BADGER CORP., 327 E. Brown St., Milwaukee, Wis.—Booth 982.

BARBER-COLMAN CO., Rockford, Ill.—Booths 171-173.

BARD MFG. CO., Bryan, Ohio—Booth 681.

In attendance: C. H. Tomes, Paul Faulkner, L. Lobdell, R. O. Bard.

Exhibiting: Oil-fired forced air unit; gas-fired forced air unit; electric water heater; cooling unit; conversion oil burner; conversion gas burner.

BARNES & JONES, INC., 128 Brookside Ave., Jamaica Plain 30, Mass.—Booth 362.

In attendance: G. A. Rock, C. W. Larson.

Exhibiting: Steam heating specialties.

BEAR MFG. CO., Rock Island, Ill.—Booth 861.

In attendance: Ray L. Johnson, James H. Sullivan, Maurice J. Eldridge.

Exhibiting: "Dy-Namic" balancing machines for industry.

BEATON & CADWELL MFG. CO., New Britain, Conn.—Booth 341.

In attendance: R. H. Hubbard.

Exhibiting: Relief valve; "Perfection" floor and ceiling plates; air valves; new line of pressure reducing valves and strainers.

BEAVER PIPE TOOLS, INC., Warren, Ohio—Booths 988-990.

In attendance: J. A. Thornton, E. R. Barkley.

Exhibiting: Pipe machines.

BELL & GOSSETT CO., Morton Grove, Ill.—Booth 221.

In attendance: E. J. Gossett, R. E. Moore, C. E. Pullum, R. A. Patterson, E. L. Malm, Frank Hackett.

Exhibiting: Forced hot water heating equipment for systems using radiators, convectors, unit heaters, or radiant panels; water heaters for use with steam or hot water boilers; operating zone control system; actual life size samples of radiant panel coils installed in various types of construction; a unique device for keeping water heater coils clean; something new in assemblages of air conditioning components.

BENDIX AVIATION CORP., FRIEZ INSTRUMENT DIV., Taylor Ave. and Lock Raven Blvd., Towson, Baltimore 4, Md.—Booths 742-744-746.

See Friez Instrument Div.

B. G. B. MFG. CO., 5021 Wyoming, Dearborn, Mich.—Booth 948.

BISHOP & BABCOCK MFG. CO., 4901 Hamilton Ave., Cleveland 14, Ohio—Booth 768.

In attendance: Walter Root, J. B. Thompson, Howard King, A. L. Donahue, R. J. Doughty.

Exhibiting: Centrifugal fans; blowers; unit heaters; furnace blowers; wheels and housings.

BLACK & DECKER MFG. CO., Towson 4, Md.—Booths 655-657.

In attendance: William J. Fenwick, Harry Bullock, George F. Hornung, R. P. Wightman, J. F. Apsey, Jr., W. G. Burggraf.

Exhibiting: Portable electric drills, shears, and sanders; electric bench and portable grinders; portable electric screw drivers, saws, and hammers; attachments and accessories.

BORG-WARNER CORP., INGERSOLL STEEL DIV., 310 S. Michigan Ave., Chicago 4, Ill.—Booths 636-638.

See Ingersoll Steel Div.

BORG-WARNER CORP., NORGE-HEAT DIV., 547 W. Woodbridge St., Detroit, Mich.—Booth 848.

See Norge-Heat Div.

BREUER ELECTRIC MFG. CO., 5100 Ravenswood Ave., Chicago 40, Ill.—Booth 466.

In attendance: G. W. Breuer, L. C. Miles, R. R. Janke.

Exhibiting: Industrial and furnace vacuum cleaners; portable electric blowers; dust collectors.

BROWN ELECTRIC CO., 98-11 65th Ave., Forest Hills, N. Y.—Booth 966.

In attendance: A. Brown, H. Leffer.

Exhibiting: 1/6 flg. type oil burner motor; ignition transformer; "V-M" motorless hot water circulator; fuel oil preheaters; internal and external tankless water heaters; perhaps a hermetically sealed ignition transformer.

BRUNDAGE CO., 512 N. Park St., Kalamazoo 11, Mich.—Booth 510.

In attendance: F. W. Brundage, H. F. Brundage, F. R. Bishop, L. W. Reining, E. N. Moncrief, N. M. Reisdorph, N. E. Hill, H. J. Kirkendall, H. Perkinson, P. Simmons, J. G. Hildebrand, H. W. Winningham.

Exhibiting: Upblast and bottom horizontal discharge blower assemblies; blower-filter package units.

BUFFALO FORGE CO., 171 Mortimer St., Buffalo, N. Y.—Booth 158.

In attendance: F. B. Stubinger, C. C. Chester, T. A. Weager, R. W. Sherman, T. A. Weager, Jr.

Exhibiting: "LL" fans, axial flow fans, industrial exhausters, evaporative water cooler, "PCGW" wet glass cell air washer.

BURNHAM BOILER CORP., Irvington, N. Y.—Booth 122.

In attendance: F. R. Brophy, V. A. Good, J. F. Orr, B. A. Chreiman, D. W. Stevens, E. A. Snyder.

Exhibiting: "Base-Ray" standard" and "Hi-Power" radiant baseboard; radiant radiator; slenderized radiator; "Yello-Jacket" boiler for automatic firing; "De Luxe" oil burning boiler.

CALUMET AND HECLA CONSOLIDATED COPPER CO., WOLVERINE TUBE DIV., 1411 Central Ave., Detroit 9, Mich.—Booth 507.

See Wolverine Tube Div.

CARGOCAIRE ENGINEERING CORP., 15 Park Row, New York 7, N. Y.—Booth 554.

CARRIER CORP., 300 S. Geddes St., Syracuse 1, N. Y.—Booth 233.

In attendance: D. B. Arnold, G. T. Long, G. T. Stoltz.

Exhibiting: New "5 Series" condensing unit; conduit "Weathermaster" system; heat diffusers and unit heaters; self-contained air conditioners.

CARTER COAL CO., 630 Fifth Ave., New York 20, N. Y.—Booth 842.

In attendance: A. G. Olson, C. W. Somers, H. J. Ray.

Exhibiting: "Olga" coal; small glass furnace.

CENTURY ENGINEERING CORP., 418 Third Street S. E., Cedar Rapids, Iowa—Booths 845-847.

In attendance: E. J. Lattner, M. D. McWilliams, Robt. P. Nessler, Keith R. Dunn, Ray Considine, C. C. Thompson, John Rosche, Hal Rowe, W. Charbonneaux.

Exhibiting: Boiler-burner unit; furnace-burner unit; oil burners; water heaters.

CHACE CO., W. M., 1600 Beard Ave., Detroit 9, Mich.—Booth 439.

In attendance: H. B. Trix, J. A. Kienle, J. C. Schwab, C. F. Allan, H. D. Matthews.

Exhibiting: Thermostatic bimetal elements.

CHAR-GALE MFG. CO., 3127 Hiawatha Ave., Minneapolis 6, Minn.—Booth 659.

In attendance: C. L. Johnston, L. C. Johnston, N. J. Dovolis, G. C. Standen, R. W. Thorp, E. R. Johnston.

Exhibiting: Aluminum fittings, registers, and grilles.

CHICAGO FILTER CO., P. O. Box 807, Joliet, Ill.—Booth 637.

CHICAGO PUMP CO., 2300 Wolfram St., Chicago 18, Ill.—Booth 266.

In attendance: George D. Bers, Milton Spiegel, H. E. Martin, E. A. Ehrlich, Ralph Carter.

Exhibiting: "Condo-Vac" return line vacuum and condensation pump for heating systems; "Sure Return" condensation pump and receiver; "Flush-Kleen" clogproof sewage pump (a duplex set of these pumps will be in operation in booth); vertical condensation pump; circulating pumps.

CHRYSLER CORP., AIRTEMP DIV., Dayton, Ohio—Booths 72-74-76-78.

See Airtemp Div.

CLARAGE FAN CO., Kalamazoo, Mich.—Booths 729-731.

In attendance: C. O. Fury

Exhibiting: "Multitherm" unit (blow through type)—a horizontal type air conditioning unit operating on the "blow-through" principle and provided with multiple face and by-pass dampers to permit individual temperature control of separate zones, thus permitting compensation for variation of solar radiation, wind velocity, internal loads, etc. imposed simultaneously on different areas of the conditioned space; type "W" fan backwardly curved blade (high speed) ventilating fan with self-limiting horsepower characteristic; type "DF" fan—small multiblade fan for use in conjunction with furnaces or air conditioning units; stoker fan assembly with "Vortex" control—a method of obtaining variable volume control at constant speed without power wastage; type "RT" fan wheel, showing the rigid construction of a self-cleaning, high speed mechanical draft fan wheel; capillary cells, demonstrating the construction of the cell used in capillary type air washers and conditioning units—high saturating efficiency with relatively low water quantities.

CLAYTON & LAMBERT MFG. CO., Louisville 10, Ky.—Booths 459-461.

In attendance: Ralph E. Leffler, L. P. Brett, Richard Newlin.

Exhibiting: Prefabricated duct and duct fittings for forced air heating; galvanized pipe and fittings for gravity warm air heating systems.

CLEAVER-BROOKS CO., 326 E. Keefe Ave., Milwaukee 12, Wis.—Booth 846.

In attendance: Robert Denny, Eric Tank, P. J. Shomer.

Exhibiting: "Hev-E-Oil" burner.

CLEVELAND STEEL PRODUCTS CORP., Madison at W. 74th St., Cleveland, Ohio—Booths 178-277-598.

See Torridheet Div.

COLEMAN CO., INC., Saint Francis & Second St., Wichita 1, Kans.—Booths 58-60-62.

In attendance: Harry G. Falter, Frank A. Hanus, Jack W. Kice, L. L. Songer.

Exhibiting: Floor furnaces.

COLE-SEWELL ENGINEERING CO., 2288 University Ave., St. Paul 4, Minn.—Booth 339.

In attendance: A. D. Cole, H. J. Sewell, E. W. Laudert, I. E. Loring.

Exhibiting: Draft governors; draft "Korektors."

COMBUSTION CONTROL CORP., 77 Broadway, Cambridge 42, Mass.—Booth 639.

In attendance: John A. Long, Phillip N. Mann, E. P. Craun, J. M. Craun, W. A. Liebing, J. P. Blanchard.

Exhibiting: New "Fireye" electronic combustion control system, which includes photoelectric scanner for monitoring oil-fired equipment and safeguarding against the hazards identified with flame failure; electronic flame rod for monitoring gas flames and protecting against the hazards identified with flame failure; programming control for programming fuel valves and pumps, ignition systems, and the complete cycle of operation of automatically fired oil and gas burners; electronic boiler low-water safeguard for protecting commercial and industrial boilers against low water level condition; boiler feedwater control for the control of pumps and valves; "Photoswitch" smoke control equipment.

COMMERCIAL FILTERS CORP., 18 W. Third St., Boston 27, Mass.—Booth 651.

In attendance: E. W. Sherburne.

Exhibiting: Filters for heating oils of oil burners, stoves, heaters, etc. and bulk delivery of oil companies.

CONCO ENGINEERING WORKS, Mendota, Ill.—Booths 656-658.

In attendance: Walter Sormane, J. B. Walton, R. C. Gustafson, Lee Beardsley.

Exhibiting: Oil fired and gas fired winter air-conditioners; oil fired water heaters; stokers; conversion oil burners.

CONNOR ENGINEERING CORP., W. B., 114 E. 32nd St., New York 16, N. Y.—Booth 571.

In attendance: H. Sleik, H. A. Baker, H. T. Porter, R. A. Conklin.

Exhibiting: "Dorex" activated carbon air recovery and purification equipment; "Kno-Draft" adjustable air diffusers; practical demonstrations of both these products.

CONSOLIDATION COAL CO., Koppers Bldg., Pittsburgh 19, Pa.—Booths 775-777.

In attendance: E. C. Robertson, A. H. Hunt, A. A. Jenkins, C. W. Clayton, H. S. Prentice, H. N. Smith, H. S. Matthews, J. B. Feather.

Exhibiting: Large illuminated map of northeastern half of United States showing location of producing properties and sales offices by means of electric lights. Two turning tables of mine photographs in color and illuminated, and other interesting features.

CONTINENTAL INSTRUMENT CO., 11226 Superior Ave., Cleveland 6, Ohio—Booth 841.

In attendance: H. Friedberg, I. Bookatz.

Exhibiting: Safety pilot; new automatic ignition feature available with pilot; device demonstrating degree of movement of the pilot thermo element.

COROAIRE HEATER CORP., 1422 Euclid Ave., Cleveland 15, Ohio—Booths 763, 765, 767, 771.

In attendance: A. W. Conley, J. D. Conley, C. F. Breitenbach, J. B. Finger, J. W. Maier, Miss D. L. Schultz, Wm. Baird, Wm. Leonard, E. O'Donnell, R. B. Battle, Ora Grass, Mr. Forrester, R. A. Mileti.

Exhibiting: Console space heater; forced air furnace; "Hot Boy" forced air circulating heater.

CRAIN-BRENNAN ASSOCIATES, 1115 Citizens Bldg., Cleveland, Ohio—Booth 867.

In attendance: E. F. C. Petering, J. Miller, E. J. Crain, J. E. Brennan.

Exhibiting: "Lonergan" oil circulating space heaters and water heaters; "Ventu-Rotor" heater with floor delivery of heat.

CRANE CO., 836 S. Michigan Ave., Chicago, Ill.—Booths 955-957-959.

In attendance: W. D. Howard, F. Mauer, C. Shine, C. R. Bushong, R. C. Schroeder, J. J. Robbins, J. K. Morrissey.

Exhibiting: Hand and stoker fired boilers; oil and gas fired boilers; baseboard radiation; enclosed and open radiation.

CURTIS REFRIGERATING MACHINE DIV., 1905 Kienlen Ave., St. Louis 20, Mo.—Booths 541-543.

In attendance: W. C. Hecker, H. C. Morrison, H. J. Nettler, K. T. Rockey, N. H. Behrend, M. C. Jones, Wm. Cawley, Geo. Helde.

Exhibiting: Packaged air conditioning units; refrigerating compressors; air conditioning compressors.

CYCLOTHERM CORP., 90 Broad St., New York 4, N. Y.—Booths 863-865.

In attendance: Harper Holt, Aatto Saha, Wm. Palm, V. N. Connors, J. W. Stevens, W. V. Young, Tom Corbett, Stan Dziedzic.

Exhibiting: Combination gas and oil fired steam generator; feedwater pump set; operating demonstration of combustion principle.

DAYTON RUBBER MFG. CO., 2342 W. Riverview Ave., Dayton 1, Ohio—Booths 460-462.

In attendance: K. L. Bohler, D. W. McLaughlin, J. T. Wilson, W. J. Michel, K. R. Van Doren.

Exhibiting: V-belt drives; "Thorobred" and "F.H.P." V-belts; "Day-Steel" pulleys.

DELAVAN ENGINEERING CO., Des Moines, Iowa—Booths 934-936.

In attendance: H. L. McNally, Eugene O. Olson, Nelson B. Delavan.

Exhibiting: Oil burner nozzles and accessories; spray nozzles.

DELCO APPLIANCE DIV., GENERAL MOTORS CORP., 391 Lyell Ave., Rochester, N. Y.—Booths 730-732-829-831.

In attendance: A. R. Mann, K. C. Lewis, T. J. Affleck, Jr.

Exhibiting: Representative types of oil fired, gas fired, and coal fired "Delco-Heat" automatic heating equipment for residential installations; representative types of water systems for deep well, shallow well, and jet applications on farms, rural non-farm and suburban homs.

DETROIT GAS REGULATOR CO., 1742 Rivard, Detroit, Mich.—Booths 942-944.

In attendance: John M. Brady, Frank Kern, Jr., Larry Lorentzen.

Exhibiting: Complete line of low pressure gas regulators; perhaps new line of regulators for propane and butane gas; test stand showing how regulators are tested at various pressures as specified by AGA requirements; bubble test to show any imperfections.

DETROIT LUBRICATOR CO., 5900 Trumbull Ave., Detroit 8, Mich.—Booths 834-836-838.

In attendance: C. H. Hodges, Jr., G. B. Duffield, E. J. Doucet, G. E. Cage, K. B. Thorndike, F. Y. Carter, F. G. Coggin, W. H. Hohmeyer, R. C. Springston, R. M. Bard, R. L. Campbell, F. D. Cooper, J. H. Deane, E. J. Dillman, T. C. McKee, J. F. McKenna, R. F. Stoll, J. M. Strauss, H. L. Walker.

Exhibiting: Control equipment for gas heating, oil heating, refrigeration, and air conditioning.

DIELECTRIC PRODUCTS CO., INC., 125 Virginia Ave., Jersey City 5, N. J.—Booth 21.

In attendance: Henry T. Carey, Irving H. Clement, Noah McCaig, Phil Krueger.

Exhibiting: Ignition electrode assemblies, bus bar assemblies, cable assemblies for use on domestic oil burners.

DODGE CORP., F. W., 119 W. 40th St., New York 18, N. Y.—Booths 39-40.

Exhibiting: Company services and publications.

DOLE VALVE CO., 1901-1941 W. Carroll Ave., Chicago 12, Ill.—Booth 621.

In attendance: J. F. Lund, J. A. Coghill.

Exhibiting: Air valves; water mixers; brass fittings.

DOMESTIC ENGINEERING, 1900 Prairie Ave., Chicago 16, Ill.—Booth 357.

Exhibiting: Publications.

DOMESTIC ENGINE AND PUMP CO., Shippensburg, Pa.—Booth 745.

See Power Plant Supply Co.

DONGAN ELECTRIC MFG. CO., 2987 Franklin St., Detroit 7, Mich.—Booth 661.

In attendance: Jas. B. Evans, Allen D. Walter, K. I. Clisby, Irwin K. Clisby, Lyle J. Hicks.

Exhibiting: Oil burner ignition transformers; testing transformers.

DOWAGIAC STEEL FURNACE CO., Dowagiac, Mich.—Booths 456-458.

DOYLE VACUUM CLEANER CO., 225 Stevens St., S. W., Grand Rapids 7, Mich.—Booth 19.

In attendance: D. I. Doyle, Sr., D. I. Doyle, Jr., Bruce Henderson, Louis F. Hodgins, Pat Doyle, Norman S. Brooke.

Exhibiting: "Grand Rapids Deluxe" furnace cleaner; warm air furnace cleaning tools; combination boiler and warm air cleaning tools; chimney cleaning equipment.

DRAVO CORP., 300 Penn Ave., Pittsburgh 22, Pa.—Booth 947.

Exhibiting: "Counterflo" direct fired heaters; crane cab cooler.

DUNHAM CO., C. A., 450 E. Ohio St., Chicago 11, Ill.—Booth 148.

In attendance: O. J. Prentice, L. D. Mandell, J. W. Jungels, M. W. Shears, H. D. Henion.

Exhibiting: Unit heaters; convectors; pumps; baseboard heating; high pressure traps; radiator traps; valves.

DUO-THERM DIV., MOTOR WHEEL CORP., Lansing 3, Mich.—Booth 265.

In attendance: Don Jones, A. R. Frantz, Karl Egeler, John Miller, B. D. Figg, Ray Christman, Theo Valjean, J. K. Nelson, G. C. Weaver.

Exhibiting: Oil burning furnaces; oil burning water heaters; oil space heaters.

DWYER MFG. CO., F. W., 317 S. Western Ave., Chicago 12, Ill.—Booth 937.

In attendance: J. G. Dwyer, P. W. Dwyer.

Exhibiting: CO_2 indicators; draft gages; manometers; and smoke detector which is a completely new instrument just being introduced on the market.

ECKHART MFG. CO., 470 First Ave. West, Roselle, N. J.—Booths 852-854.

In attendance: Arnold Eckhart, Sr., H. F. Rodler, V. S. Radlinski, W. M. Croker.

Exhibiting: "Silent Korth" domestic oil burners and winter air conditioning units.

EL VAN AYRE CORP., 13540 Linwood Ave., Detroit 6, Mich.—Booths 736-738-740.

EMERSON ELECTRIC MFG. CO., 8100 Florissant Ave., St. Louis 21, Mo.—Booth 534.

In attendance: J. D. Waterbury, W. R. Fraser.

Exhibiting: Motors for air conditioning units; unit heaters; refrigerators; stokers; oil burners; fan duty, oscillating, air circulator, exhaust, cooler, and kitchen ventilator fans.

ENTERPRISE ENGINE & FOUNDRY CO., 18th & Florida Sts., San Francisco, Calif.—Booth 520.

In attendance: J. F. McIndoe, R. G. Capron.

Exhibiting: Industrial horizontal rotary oil burners.

FAIRBANKS, MORSE & CO., 600 S. Michigan Ave., Chicago, Ill.—Booths 733-735-737-739.

In attendance: Ray Harnetiaux, Neil Dygert, Art Thys, Tom Mulcahey, Bill Lynn, John Letky, Andy Papailion, Lou Harlow, F. J. Kluempers.

Exhibiting: Domestic, commercial and industrial stokers.

FARR CO., 2615 Southwest Dr., Los Angeles, Calif.—Booth 576.

In attendance: W. H. Welty, F. X. Shea, W. G. Butler, A. C. Danks.

Exhibiting: "Far-Air" air filters.

FEDDERS-QUIGAN CORP., 57 Tonawanda St., Buffalo, 7, N. Y.—Booths 281-282.

In attendance: E. R. Walker, G. M. Meyer, R. W. Morgan, L. J. Sahs, H. A. Laney, A. G. Trometer, E. H. Weigel, W. C. Winkler, W. Reeves, A. J. DeFino, W. E. Zielonka, F. E. Kahler, H. G. Williams, J. P. Guerra.

Exhibiting: Horizontal and downblow unit heaters.

FIELD CONTROL DIV. OF H. D. CONKEY & CO., Mendota, Ill.—Booth 25.

In attendance: C. W. Potter, R. A. Friestad, E. A. Field, James Burch.

Exhibiting: Barometric draft controls; "Scotty Field," the watchdog of the fuel.

FIRELINE STOVE & FURNACE LINING CO., 1800 Kingsbury St., Chicago 14, Ill.—Booth 26.

FITZGIBBONS BOILER CO., INC., 101 Park Ave., New York 17, N. Y.—Booth 258.

In attendance: Homer Addams, Paul K. Addams, R. C. Malvin, O. F. Noss, Gilbert Nelligann.

Exhibiting: A complete line of boilers and warm air furnaces "designed to care for the heating requirements of everything from the small, veterans' type of housing to the largest development."

FOREST CITY FOUNDRIES CO., NIAGARA FURNACE DIV., 2500 W. 27th St., Cleveland 13, Ohio—Booths 536-538.

See Niagara Furnace Div.

FREEMAN STOKER DIV., ILLINOIS IRON & BOLT CO., 918 S. Michigan Ave., Chicago 5, Ill.—Booth 544.

See Illinois Iron & Bolt Co.

FRICK CO., INC., Waynesboro, Pa.—Booth 751.

In attendance: W. H. Aubrey, C. C. Smith, P. H. Buch, M. W. Garland, W. O. Kline.

Exhibiting: Enlarged photographs of installations of air conditioning and refrigerating equipment.

FRIEZ INSTRUMENT DIV., BENDIX AVIATION CORP., Baltimore 4, Md.—Booths 742-744-746.

In attendance: LeRoy D. Kiley, R. B. Stevenson, Allen A. Putt, Asa Gardiner, W. E. Hopkins, W. W. Stevens, S. S. Haynes, Paul Frerer.

Exhibiting: Electrical controls for heating and ventilating; humidity and temperature recorders and indicators.

FUELOIL & OIL HEAT, 232 Madison Ave., New York 16, N. Y.—Booth 547.

Exhibiting: Publication.

FULTON SYLPHON CO., Knoxville 4, Tenn.—Booths 434-436.

In attendance: C. O. Pettersson, J. T. Finley, E. D. Rogers, F. G. Cross, L. S. Dysart, W. J. Hajek

Exhibiting: Temperature and pressure controls for heating, ventilating and air conditioning.

GAR WOOD INDUSTRIES, INC., 7924 Riopelle St., Detroit, Mich.—Booths 142 & 241.

See Wood Industries, Inc., Gar.

GENERAL BRONZE CORP., 34-19 Tenth St., Long Island City, N. Y.—Booths 924-926.

In attendance: H. L. Finley, L. H. Seaman, F. Bingold.

Exhibiting: Warm air furnaces available for either gas or oil.

GENERAL CONTROLS CO., 801 Allen Ave., Glendale 1, Calif.—Booth 157.

In attendance: W. A. Ray, W. R. Ray, J. F. Ray.

Exhibiting: Complete line of heating and air conditioning controls; pressure, temperature, and flow controls.

All roads will lead to Cleveland January 27-31

GENERAL ELECTRIC CO., 1 River Rd., Schenectady 5, N. Y.—Booth 752.

In attendance: N. L. Parker, C. W. Downs.

Exhibiting: Motors and control.

GENERAL FILTERS, INC., 12890 Westwood Ave., Detroit 23, Mich.—Booth 916.

In attendance: Robert G. Gregory, L. C. MacLachlan, Arthur D. Redner, Mrs. Arthur D. Redner, William J. Debler, Sr., William J. Debler, Jr.

Exhibiting: "Deluxe," "Standard," and "Master" fuel oil filters, the last-named being brand new.

GENERAL MOTORS CORP., DELCO APPLIANCE DIV., Rochester, N. Y.—Booths 730-732-829-831.

See Delco Appliance Div.

GENERAL PLATE DIV., METALS AND CONTROLS CORP., 34 Forest St., Attleboro, Mass.—Booths 646-648.

See Metals and Controls Corp.

GREENLEE TOOL CO., DIV. OF GREENLEE BROS. & CO., Rockford, Ill.—Booth 961.

In attendance: A. H. Hawkinson, J. A. Edwards.

Exhibiting: Hydraulic pipe bender for radiant heating installations; hand and hydraulic benders for pipe, tubing, etc.; hydraulic pipe pusher; electricians punches (knockout); auger bits; screw drivers; push drills; chisels (carpenter); gouges; draw knives.

GRINNELL CO., INC., Providence 1, R. I.—Booths 338-340.

In attendance: Hugh Welshman, D. O. Anderson, A. B. Donkerseley, A. F. Van Eck, D. A. Johnson.

Exhibiting: Pipe fittings, welding fittings, pipe hangers, flared fittings, unions, diaphragm valves, unit heaters, prefabricated piping, automatic sprinklers, constant support hangers, spring hangers, sway braces.

GUARDIAN PRODUCTS CORP., 215 E. Michigan St., Michigan City, Ind.—Booth 509.

In attendance: V. E. Malmfeldt, H. D. Schweitzer.

Exhibiting: Flexible couplings—regular type with die cast ends for general purposes, and splined type for use with splined hub blower wheels on oil burners.

HARRIS & CO., ARTHUR, 212 N. Aberdeen St., Chicago 7, Ill.—Booth 355.

In attendance: George C. Harris.

Exhibiting: Copper and stainless steel floats.

HART & COOLEY MFG. CO., 500 E. 8th St., Holland, Mich.—Booth 530.

In attendance: J. B. Jones, F. H. Heads, G. D. Heeringa, E. H. Rowder, J. H. Van Alsburg.

Exhibiting: Warm air registers and grilles; furnace accessories.

HARVEY-WHIPPLE, INC., 55 Emery St., Springfield, Mass.—Booth 503.

HEATING, PIPING & AIR CONDITIONING 6 N. Michigan Ave., Chicago 2, Ill.—Booth 552.

In attendance: Frank P. Keeney, Chas. E. Price, C. M. Burnam, Jr., Wallace J. Osborn, Robert A. Jack, James D. Thomas, George C. Cutler, Ralph M. Jepsen.

Exhibiting: Publications, technical books, market data.

HEATING AND VENTILATING, 148 Lafayette St., New York 13, N. Y.—Booths 342-344.

Exhibiting: Publication.

HEIL CO., 3000 W. Montana St., Milwaukee 1, Wis.—Booth 242.

In attendance: Joseph F. Heil, H. F. Pugh, George Hochstein, Roy King, William Hatch, Fred Zwanzig, Robert Horton, Karll Mould, Fred Hoffman, Charles Allis, Walter Haise.

Exhibiting: Oil-fired furnace; utility fired furnace; oil-fired boiler-burner; steel gas-fired furnace; cast iron gas-fired furnace; conversion oil burners—all "completely new."

HENRY FURNACE CO., Medina, Ohio—Booth 247.

In attendance: James Crombie, C. A. Olsen, Edward P. Hayes.

Exhibiting: "Moncrief" gravity warm air furnaces; air conditioning units; furnace pipe and fittings; prefabricated duct; "Maynair" stack head dampers.

HENRY VALVE CO., 3260 W. Grand Ave., Chicago 51, Ill.—Booths 334-336.

In attendance: Charles V Gary, Richard S. Dawson, George W. Wilson, Charles C. Allen, Harold F. Stamps.

Exhibiting: New solenoid valves which incorporate many changes in design, such as integral outlet boxes, soft seats for tight shutoff, and construction permitting valves to be taken apart without disturbing electrical or piping connections; new ammonia solenoid valve of compact design; new magnetic float switch for pressure vessels, with stuffing box eliminated; packed and packless valves; new check valves; improved designs of refrigeration dryers, strainers, and relief valves; pressure regulating valves; other automatic control devices.

HERCO OIL BURNER CORP., 109 W. Chestnut St., Lancaster, Pa.—Booth 18.

In attendance: Harold H. Wilkinson, Fred A. Wiker.

Exhibiting: Oil burners.

HOFFMAN SPECIALTY CO., 1001 York St., Indianapolis 7, Ind.—Booth 134.

In attendance: J. C. Murphy, C. W. Little, W. W. Dillon.

Exhibiting: Radiator valves; thermostatic traps; float thermostatic traps; temperature controls for hot water heating; warm air furnaces; panel heating.

HOLCOMB & HOKE MFG. CO., INC., 1545 Van Buren St., Indianapolis, Ind.—Booths 82-83.

In attendance: Harry E. Blasingham, Harry R. Blasingham, Bowman Downey.

Exhibiting: Ventilating fans for residential and non-residential uses.

HOLLERAN METAL PRODUCTS, DIV. OF O'HALLORAN INDUSTRIES, 12305 Turner Ave., Detroit 4, Mich.—Booth 938.

HOME EASE PRODUCTS DIV., INC., BOGUE ELECTRIC CO., 52 Iowa Ave., Patterson 3, N. J.—Booth 823.

HOPWOOD & ASSOCIATES, INC., J. W. 7710 Carnegie Ave., Cleveland, Ohio—Booth 437.

In attendance: J. W. Hopwood, C. S. Rajniak, M. I. Jones, H. C. Sedor, J. T. Longo, M. C. MacNaughton, E. I. Tindall.

Exhibiting: Forced air and gravity warm air furnaces; featuring unique design of combustion chamber.

ICE AIR CONDITIONING CO., INC., 794 Union St., Brooklyn 15, N. Y.—Booths 590-592.

In attendance: Don V. Petrone, Don J. Dailey, Edw. J. Beck, Ernest W. Farr, Jr., A. Peltz, B. F. Bash.

Exhibiting: Five and seven ton self contained units; heating coil; cooling coil; condenser.

ILLINOIS ENGINEERING CO., Racine Ave. at 21st St., Chicago 8, Ill.—Booth 64.

In attendance: Robt. L. Gifford, J. C. Matchett, J. L. Ehretsman, R. W. Leutwiler, R. V. Faulks.

Exhibiting: Steam heating system equipment and controls—generation controls, continuous flow control (pneumatic), and continuous cycling control (electric); steam power specialties.

ILLINOIS IRON & BOLT CO., FREEMAN STOKER DIV., 918 S. Michigan Ave., Chicago 5, Ill.—Booth 544.

In attendance: W. F. Glenn, F. W. Cochrane, G. S. Peters.

Exhibiting: "LongLife" stoker.

ILLINOIS TESTING LABORATORIES, INC., 420 N. LaSalle St., Chicago 10, Ill.—Booth 10.

In attendance: W. J. Bailey, M. D. Carlson, E. F. Burke.

Exhibiting: "Velometer"; resistance thermometer; dew point indicator.

IMPERIAL BRASS MFG. CO., 1200 W. Harrison St., Chicago 7, Ill.—Booth 63.

In attendance: C. H. Benson, M. Mitchell, A. Mitchell, F. Wilson, G. Franck, J. T. Greenlee, E. F. Todd.

Exhibiting: Tube fittings; shutoff valves; saddle valves; tube working tools; welding and soldering equipment; refrigeration valves; refrigeration tube fittings; refrigerant dehydrators; refrigerant filters.

INDEPENDENT REGISTER CO., 3747 E. 93rd St., Cleveland 5, Ohio—Booth 448.

In attendance: B. N. Richardson, K. B. Solberg.

Exhibiting: Registers and grilles for heating, ventilating and air conditioning.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.—Booth 537.

In attendance: J. M. Wells, R. C. Behrens, S. B. Wolfe, A. L. Keeler, A. J. Tyler, E. K. Kesterson, O. E. Schneider, R. G. Carrier.

Exhibiting: Fractional horsepower circulating pumps, designed specifically for air conditioning, refrigeration, and heating applications; working model demonstrating operation of these pumps.

INGERSOLL STEEL DIV., BORG-WARNER CORP., 310 S. Michigan Ave., Chicago 4, Ill.—Booths 636-638.

In attendance: George W. Day, A. Ford-Lovelace, John F. Ashe, L. M. Crist.

Exhibiting: "Koolshade" sun screen; "Stormshade" (combination storm windows and sun screen with aluminum frames).

INSUL-WOOL INSULATION CORP., 3820 St. Clair, Cleveland, Ohio—Booth 677.

In attendance: J. T. Harrison, Keith Luther, R. G. Houser, Edward Mead, John W. Laing, Wm. J. Kropp, John B. Watt.

Exhibiting: Insulation; weatherstripping.

IRON FIREMAN MFG. CO., 3170 W. 106th St., Cleveland 11, Ohio—Booths 939-941-943-945.

In attendance: C. T. Burg, R. E. Gunn, Dale Wylie, H. C. Cutshaw, T. A. Marsh, C. D. Carter, Fred Fenker.

Exhibiting: Domestic and commercial stokers; domestic oil burners and self-firing warm air furnaces and boilers with built-in stokers or oil burners; heating control systems.

JACKSON & CHURCH CO., Saginaw, Mich.—Booths 871-877.

In attendance: Larry S. Redford, Ed Root, Gene Skelton, W. C. MacDougall, Charles J. Low, Harold M. Foehl.

Exhibiting: "J & C" power heaters for home use and for industrial and commercial installations.

JACKSON GAS BURNER CORP., 8781 Quincy Ave., Detroit 4, Mich.—Booth 587.

In attendance: Mr. and Mrs. Jas. H. Jackson.

Exhibiting: Conversion gas burners, power driven, two models, pilot light and electric ignition.

JEFFERSON ELECTRIC CO., Bellwood, Ill.—Booth 734.

In attendance: C. T. Harnett, R. A. Hoagland, F. H. Pickerill.

Exhibiting: Transformers.

JENKINS BROS., 80 White St., New York 13, N. Y.—Booths 455-457.

Exhibiting: Bronze, iron, cast steel and stainless steel valves; renewable composition discs. Feature of exhibit will be a scale model of a power plant, complete in every detail, tying in with "Practical Piping Layout" campaign.

JOHNS-MANVILLE CORP., 22 E. 40th St., New York 16, N. Y.—Booths 641-643.

In attendance: G. R. Lewis, J. R. East, A. J. Curtis, E. E. Clapsadel, R. A. Gallimore, T. L. Haler, A. M. Rackett, C. C. Holmes.

Exhibiting: Home insulation; industrial insulation; acoustical duct linings; refractories.

JOHNSON CO., S. T., 401 N. Broad St., Philadelphia 8, Pa.; 940 Arlington Ave., Oakland 8, Calif.—Booth 950.

In attendance: J. C. Johnson, R. P. Johnston, L. W. Kline, W. Thoms, W. E. Lees.

Exhibiting: Residential, commercial, and industrial oil burners; water heaters; boilers and furnace burner units.

JOHNSON SERVICE CO., 507 E. Michigan St., Milwaukee 2, Wis.—Booths 527-528.

In attendance: M. M. Herrick, P. D. Gayman, D. W. Gladieux, Howard Menges, I. J. Stroh.

Exhibiting: Automatic temperature control for all types of heating, cooling, ventilating, air conditioning, and industrial processing installations. Equipment will be shown in actual operation. Illustrative applications to various problems will be demonstrated.

K & F DISTRIBUTING CO., 1300 W. Third St., Cleveland 13, Ohio—Booths 833-835.

KAUFFMAN AIR CONDITIONING CO., 4505 Olive St., St. Louis, Mo.—Booth 918.

In attendance: Sam Kauffman, Angus Burns.

Exhibiting: Room coolers (½ ton, ¾ ton window models; ½ ton, ¾ ton, 1 ton, 1½ ton floor models); store coolers (3 ton, 5 ton, 10 ton, 15 ton).

KAUSTINE CO., INC., Perry, N. Y.—Booth 452.

KEENEY PUBLISHING CO., 6 N. Michigan Ave., Chicago 2, Ill.—Booth 552.

In attendance: Frank P. Keeney, Chas. E. Price, Wallace J. Osborn, Robert A. Jack, J. D. Wilder, C. M. Burnam, Jr., James D. Thomas, George C. Cutler, Ralph M. Jepsen.

Exhibiting: American Artisan, Heating, Piping & Air Conditioning; technical books, market data.

KEHM CORP., 135 S. LaSalle St., Chicago, Ill.—Booth 502.

In attendance: H. R. Coleman, C. G. Newton.

Exhibiting: Packaged gas fired hot water heating systems, including boiler, distribution system, and radiation; coal, oil, and gas fired fan operated, miniature furnaces for GI housing.

KENT CO., INC., Rome, N. Y.—Booth 363.

In attendance: C. E. Clifford, G. F. Markham, G. C. Carley.

Exhibiting: Double suction furnace cleaner.

KEWANEE BOILER CORP., Kewanee, Ill. —Booths 962, 964.

In attendance: J. M. Hartman, A. L. Vanderhoof, John Hall, Dan Billington, M. R. Hamlin, Frank C. Richardson.

Exhibiting: Bubbling boiler with observation port holes; round, jacketed, 400 sq ft steam, gas fired in operation; welded boiler, for 7000 sq ft steam, sawed-in-two section showing construction and proportionate design for complete combustion; round boiler for mechanical firing.

KOVEN & BROTHER, L. O., 154 Ogden Ave., Jersey City 7, N. J.—Booth 851.

See Waterfilm Boilers, Inc.

KRESNO-STAMM MFG. CO., 730 Sixth Ave., New York 10, N. Y.—Booth 940.

In attendance: A. Landow, Jas. E. Bree, Martin P. Holden, Al Brodsky, B. I. Stamm.

Exhibiting: Vaporizing and pressure type domestic oil burners; commercial oil burners; hot water heaters; cook stove oil burners.

KRUEGER SENTRY GAUGE CO., 1056 W. Mason St., Green Bay, Wis.—Booth 593.

In attendance: W. S. Krueger, J. F. Wilhelm, M. J. Feifarek, J. Mongin.

Exhibiting: "At-a-glance" liquid level gages; special and industrial gages.

LAU BLOWER CO., 2007 Home Ave., Dayton 7, Ohio—Booths 442-444.

In attendance: E. B. Lau, H. W. Faulkender, G. Kinsman, J. Burrowes, K. Ganger, T. I. Byrd, W. J. Lohrey, E. C. Wolford, J. B. Wallace, L. W. Gillespie, J. O. Kilian, V. N. Stewart, O. C. Sommers.

Exhibiting: Warm air heating and air conditioning blowers; blower accessories; exhaust fans.

LELAND ELECTRIC CO., Dayton 1, Ohio—Booth 948.

LINDE AIR PRODUCTS CO., INC., 30 E. 42nd St., New York 17, N. Y.—Booths 438-440.

LINK-BELT CO., 307 N. Michigan Ave., Chicago 1, Ill.—Booth 844.

In attendance: F. H. Herndon, C. H. Schuettenberg, A. H. Boike, A. Burr Curtis, H. H. Huth.

Exhibiting: Automatic coal burning equipment available for anthracite and bituminous coal, domestic, commercial, and industrial installations.

LIQUIDEPTH INDICATORS, INC., 42-26 28th St., Long Island City 1, N. Y.—Booths 65 and 952.

In attendance: Dan Bierman, N. M. Milair, Mrs. A. M. Kohl, Joseph A. Jawett.

Exhibiting: Liquid depth indicating equipment.

LONERGAN MFG. CO., Albion, Mich.—Booth 867.

In attendance: E. F. C. Petering, J. Miller, E. J. Crain, J. E. Brennan.

Exhibiting: Oil circulating space heaters; water heaters; "Ventu-Rotor" heater with floor delivery of heat.

MAID-O'-MIST, INC., 3217 N. Pulaski Rd., Chicago 41, Ill.—Booth 441.

In attendance: W. J. Woolley, O. V. Woolley, H. J. Carr, E. N. Moncrief, E. J. Busch, H. T. Waterstraat, H. Perkinson.

Exhibiting: Automatic Humidifiers for warm air furnaces, steam radiators, hot water radiators; humidifier valves; water line control valves; air eliminators for hot or cold water lines, radiators, and convectors; boiler feeders and low water cutoffs.

MARSH CORP., JAS. P., 2073 Southport Ave., Chicago 14, Ill.—Booth 660.

In attendance: James Emmett, Jr., Roy Nelson, Fred Thuemling, Robert Barnett, E. C. Kluger.

Exhibiting: Gages; thermometers; steam and hot water heating specialties; "Tri-trol" regulator.

McALEAR MFG. CO., 1933 S. Western Ave., Chicago, Ill.—Booth 745.

See Power Plant Supply Co.

McCORD CORP., 2587 E. Grand Blvd., Detroit 11, Mich.—Booth 634.

In attendance: W. G. Hancock, R. H. McGeorge, J. E. Turner, F. W. McMillan, E. O. Bodkip.

Exhibiting: Unit heaters; blast coils; fans.

McDONNELL & MILLER, INC., Wrigley Bldg., Chicago 11, Ill.—Booth 141.

In attendance: E. N. McDonnell, Jack McDonnell, George La Roi, Howard Peary, Jim Ramsay, Parker Devlin, A. D. Porter.

Exhibiting: Automatic boiler water feeders; low water fuel cutoffs; pump controllers; humidifier water level controllers.

McQUAY, INC., 1600 Broadway St., N. E., Minneapolis 13, Minn.—Booth 257.

In attendance: R. J. Resch, E. H. Seelert, R. C. Colman, D. P. Wilson, W. H. Rekdahl, E. V. Nelson, E. H. Lambert, R. N. Weber, S. R. Mishnick.

Exhibiting: Unit heaters; air conditioning units; heating and cooling coils.

MERCOID CORP., 4201 Belmont Ave., Chicago 41, Ill.—Booths 563-565.

In attendance: Hugh Courteol, J. W. Owens, I. E. McCabe, W. Colterjohn, R. F. Fisher, W. K. Stauffer, J. F. McCauley.

Exhibiting: Complete line of automatic controls for heating, air conditioning, refrigeration, and various industrial applications.

METALS & CONTROLS CORP., SPENCER THERMOSTAT CO., and GENERAL PLATE DIV., Attleboro, Mass. — Booths 646-648.

In attendance: V. G. Vaughan, J. A. Payette, J. Ottmar.

Exhibiting: Temperature controls; relief valves; safety attachments; inherent overheat protectors for motors; automotive and aircraft circuit breakers; "Truflex" thermostat metals; solid and clad precious metals; electrical contacts; silver solder; rolled gold plate.

MID-CONTINENT METAL PRODUCTS CO., 1960 Clybourne Ave., Chicago, Ill—Booth 175.

In attendance: A. F. Zitzewitz, S. K. Zitzewitz, E. J. Haedike, C. F. Petersen, S. Zavodny.

Exhibiting: "Lo Blast" power gas conversion burners.

MILLER CO., HEATING PRODUCTS DIV., Meriden, Conn.—Booths 910-912-914.

In attendance: T. L. Lawler, R. Delancey, W. Gaskel, R. Beyland, H. Sisson, W. Sullivan.

Exhibiting: Oil burner and controls for small home heating (conversion type for installation in warm air furnaces or steam or hot water boilers).

MINNEAPOLIS-HONEYWELL REGULATOR CO., 2753 Fourth Ave., S., Minneapolis 8, Minn.—Booths 248 & 347.

In attendance: J. E. Haines, Thomas McDonald, J. S. Locke, A. H. Lockrae, C. D. Lyford, G. M. Kingsland, Wesley R. Moore, Roy H. Warmee, Wm. B. Hutchinson, Chandler Murphy, Wm. Walrath, L. B. Belford, J. F. Cummiskey, C. C. Cochran, D. J. Peterson.

Exhibiting: Air conditioning controls; panel heating controls; "Moduflow"; heating controls; aeronautical controls; railway car controls; domestic air register; refrigeration controls; recorders; featuring electronic control.

MODINE MFG. CO., Racine, Wis.—Booth 548.

In attendance: Owen Desmond; M. J. Dunne, W. R. McMahon, C. T. Perkins, Benjamin Speth, G. A. Rock, W. N. Donelson, A. F. Meyers, H. A. Pillen.

Exhibiting: New 1947 line of unit heaters; convector radiation; new line of oil coolers and heat exchangers.

MONARCH MFG. WORKS, INC., Salmon & Westmoreland Sts., Philadelphia 33, Pa.—Booth 13.

In attendance: J. M. Carroll, E. B. Frantz.

Exhibiting: Oil burner nozzles; oil burner accessories (air mixing equipment, valves, strainers); water sprays; air conditioning nozzles; air washer nozzles.

MOORE CO., 544 Westport Rd., Kansas City 2, Mo.—Booth. 463.

In attendance: Whitney M. Kerr.

Exhibiting: Direct drive ventilating fans and pressure blowers.

MORRISON PRODUCTS, INC., 16816 Waterloo Rd., Cleveland 10, Ohio—Booth 748.

In attendance: Hunter Morrison, Sr., Hunter Morrison, Jr., Thompson Morrison, Al Galabi, Frank G. Marbach, John Dickson.

Exhibiting: "Airstream" blower wheels.

MORSE-SMITH-MORSE, INC., 165 Dexter Ave., Watertown 72, Mass.—Booth 630.

In attendance: W. E. Macneil, J. C. Dieselman.

Exhibiting: "Firomatic" fusible safety shutoff valves, oil filters, thermal switches, tank gage, nozzle wrench, vent caps.

MOTOR WHEEL CORP., DUO-THERM DIV., Lansing 3, Mich.—Booth 265.

See Duo-Therm Div.

MUELLER BRASS CO., 1925 Lapeer Ave., Port Huron, Mich.—Booth 518.

In attendance: R. S. Thompson, C. B. Howse, H. Baker, W. Parker, J. R. Wightman, P. L. Craft, W. J. Constable, Fred Riggin, Jr., R. M. Tree, J. E. Gray.

Exhibiting: Radiant heating panels of grid and sinuous coil types. "Streamline" drainage fittings, copper pipe and solder type cast and wrought fittings; valves; pipe bends.

MUELLER FURNACE CO., L. J., 2005 W. Oklahoma Ave., Milwaukee 7, Wis.—Booths 356-358-360.

In attendance: H. P. Mueller, J. R. Scott, M. L. Lavorgna, N. M. Blanchard, F. J. Nuelist, H. B. McKee, E. H. Saunders, Otto J. Ress.

Exhibiting: "Climatrol" gas, oil, and coal fired winter air conditioners; gas-fired boilers; gas conversion burner.

NASH ENGINEERING CO., South Norwalk, Conn.—Booths 252 & 351.

In attendance: Irving C. Jennings, Edward A. Mead, W. M. Thomson, John B. Wright, Stuart S. Lyons, W. L. Loring, R. H. Carpenter, J. B. McGregor, Clarence Love, Richard Love, Robert English, T. J. O'Brien, Fred Schaad, Jules Knop, George B. Wright.

Exhibiting: "Jennings" return line vacuum heating pumps, condensation pumps, sump pumps, sewage pumps, and sewage ejectors; air compressors; vacuum pumps; hospital pumps (clinical).

NATIONAL OIL BURNER CO., 554 Vanderbilt Ave., Brooklyn, N. Y.—Booth 633.

In attendance: Perry Wolff, Bernard Taubkin, Nathan Kaufmann, Maurice Wolff, Benjamin Raines.

Exhibiting: "Clark National" horizontal rotary and belt drive industrial burners.

NATIONAL RADIATOR CO., 221 Central Ave., Johnstown, Pa.—Booth 352.

In attendance: P. B. Holmes, P. M. Hutchins, J. W. Hall, L. N. Hunter, A. K. Tinker, Bruce Harrower, Douglas Mosteller.

Exhibiting: "Heat Extractor" boilers; gas boilers; steam boilers; "Art" radiation; "Aero" convectors.

NATIONAL THERMAL DRIVE CO., INC. Highway No. 61 & Kohlman Ave., St. Paul 9, Minn.—Booth 27.

In attendance: C. H. Peters, C. L. Stoen, M. W. Bowen, A. E. Olson, A. F. Martin, Earl Newville, Jack Newville, H. O. Berg, G. R. Hagan, Howard Perkinson.

Exhibiting: Modulating multispeed blower control, applicable to both new and old forced air heating installations whereby the speed of the blower is controlled by the temperature in the bonnet of furnace to provide continuous blower operation with velocity and temperature in balance, resulting in elimination of alternate blasts of hot and cold air, over-runs of temperature, and stratification of air ("cold 70").

NESBITT, INC., JOHN J., State Rd. and Rhawn St., Holmesburg, Philadelphia 36, Pa.—Booths 29-31-33-35.

In attendance: Albert J. Nesbitt, John J. Nesbitt, Jr., H. Berkley Hedges, Walter J. Rothenbach, James R. Bishop, Ward R. Fenstermaker, Michael J. Murray, William W. Berger, John McElgin.

Exhibiting: "Series D" heating surface with dual steam distributing tubes; "Series H" heating surface; "Series W" continuous tube cooling coils; "Series W" cleanable tube cooling coils; school-house heating and ventilating unit ("Syncretizer"); "Universal" convector.

NIAGARA BLOWER CO., 405 Lexington Ave., New York 17, N. Y.—Booth 118.

NIAGARA FURNACE DIV., FOREST CITY FOUNDRIES CO., 2500 W. 27th St., Cleveland, Ohio—Booths 536-538.

In attendance: T. S. House, I. E. Seith, W. J. Sullivan, F. T. Goodwin, W. H. MacPherson, A. L. Bastian, R. H. Leisenheimer.

Exhibiting: Gas fired winter air conditioner; gas gravity furnaces; coal furnaces.

NORGE-HEAT DIV., BORG-WARNER CORP., 594 W. Woodbridge St., Detroit, Mich.—Booth 848.

NORMAN PRODUCTS CO., 1150 Chesapeake Ave., Columbus 8, Ohio—Booths 15-17.

In attendance: E. A. Norman, Jr., D. D. Piper, E. W. Smart, W. R. Lacey, A. T. English.

Exhibiting: Gas gravity furnace; gas forced air furnace; gas boiler; gas conversion burner; gas water heater.

OLSEN MFG. CO., C. A., Elyria, Ohio—Booth 247.

In attendance: C. A. Olsen, Edward P. Hayes, C. L. Travers, D. R. Downe, C. L. Grandstaff, E. H. Ryden.

Exhibiting: "Luxaire" warm air furnaces and air conditioning units for all fuels—gas, oil, and coal.

OWENS-CORNING FIBERGLAS CORP., Toledo 1, Ohio—Booths 652-654.

In attendance: C. L. Rowley, John F. Vyverberg, R. E. Hunsaker, John W. Dowd, Ben S. Wright.

Exhibiting: "Dust-Stop" air filters; industrial and equipment insulation; decorative fabrics; roofing products; electrical insulation.

PACIFIC MFG. CORP., 5308 Blanche Ave., Cleveland, Ohio.—Booth 20.

In attendance: S. C. May, E. J. Phillips, D. R. Kemp, J. R. Farmer, H. C. Troth.

Exhibiting: Window type packaged air conditioners.

PACIFIC STEEL BOILER DIV., Detroit 31, Mich.—Booths 856-858-860.

See United States Radiator Corp.

PARAGON ELECTRIC CO., Two Rivers, Wis.—Booth 840.

In attendance: R. W. Eldred, W. C. Leff, David Douglas, Geo. Petrus.

Exhibiting: Fully automatic, synchronous motor operated timers; time delay relays; sequence timers, time switches.

PATTERSON KELLEY CO., INC., East Stroudsburg, Pa.—Booths 522-524.

In attendance: L. F. Lowe, C. E. Drake, J. A. Hall, D. B. Bilfington, F. C. Richardson, Jr., A. L. Vanderhoof.

Exhibiting: "Freon" shell and tube liquid line heat exchanger; condensers; water chillers; balance loader.

PEERLESS MFG. CO., INC., 14th & Ormsby, Louisville 10, Ky.—Booth 551.

In attendance: F. W. Carter, B. T. Bethel, W. J. Riester.

Exhibiting: New domestic push type, bin feed stoker.

PENN ELECTRIC SWITCH CO., Goshen, Ind.—Booths 181-182-183.

In attendance: Albert Penn, M. E. Henning, R. H. Luscombe, K. W. Cash, J. R. Netedu, B. J. Gill, E. M. Ford, C. B. Morgan, D. G. Cameron, F. W. Hottenroth, R. S. Penn, P. O. Penn, N. E. Jennison, A. W. Barr, A. L. Rubel, R. V. Clark, W. W. Lige, L. Linehan, G. O. Sanders, O. G. Tinkey, H. C. Shilling, J. P. Bowen, H. D. Gray, E. M. Smith, A. H. Hills.

Exhibiting: Room thermostats (line and low voltage); limit controls; stack switches; stoker timer relays; day-night clock; refrigeration controls (temperature and pressure); water valves; solenoid valves; humidistats.

PERFECTION STOVE CO., 7609 Platt Ave., Cleveland, Ohio—Booth 133.

In attendance: E. B. Goodwin, S. C. Reese, A. B. MacLaren, J. W. Shrank, R. S. Cadwallader, D. M. Reed, W. R. Wright, R. A. Walls, R. K. Brigance, J. H. Hosier, W. M. Potter, A. S. Bergschneider, F. W. Smith, H. C. Erikson, Harold Kiefer.

Exhibiting: "Superfex" gas furnaces, oil furnaces, suspended oil furnace.

PERFEX CORP., 500 W. Oklahoma Ave., Milwaukee 7, Wis.—Booths 52-54-56.

In attendance: J. K. Luthe, C. E. Lewis, L. B. Miller, B. L. Boalt, Allen Butler, H. Dale Cook, M. W. Crew, Paul Neess, S. David Horner, Murray K. Bowman, Gil A. Churchill, Paul B. Reed, B. F. Werb, C. H. Soderberg, C. B. Soper, E. G. Spall, D. J. Spahr, J. E. McMicken, Robert H. Pratt, J. W. McGuire, I. G. Bohrman, George Wallace, Robert C. Reik, Arpad Elo, George Bower.

Exhibiting: Automatic "Twin Contact" temperature controls for stoker, gas, and oil fired domestic heating systems; automatic controls and instruments for steam generating plants.

PETROLEUM HEAT AND POWER CO., Stamford, Conn.—Booths 622-626-721-725.

In attendance: J. F. Corrigan, E. F. Groves, G. Elder, E. P. Fahey, W. J. Hegan, G. A. Moore, J. E. O'Donnell, F. T. Wyckoff, F. M. Bennett, J. R. Arden.

Exhibiting: Domestic and industrial oil burners and oil fired furnaces, boilers and hot water heaters.

PETROMETER CORP., 1 Star Sq., Long Island City 1, N. Y.—Booths 65 & 952.

In attendance: Arthur D. Bierman, George H. Altemose, Miss Janina Choinski, James J. Wargas.

Exhibiting: Liquid depth indicating equipment.

PITTSBURGH CORNING CORP., 632 Duquesne Way, Pittsburgh 22, Pa.—Booth 506

In attendance: Vic Sanders, R. A. Biggs, C. B. Keown, R. F. Quinn.

Exhibiting: "PC" glass blocks; "Foamglas" insulation.

PLIBRICO JOINTLESS FIREBRICK CO., 1800 Kingsbury St., Chicago 14, Ill.—Booth 26.

PLUMBING & HEATING JOURNAL, 45 W. 45th St., New York 19, N. Y.—Booth 365.

Exhibiting: Publication.

POCAHONTAS FUEL CO. INC., Stoker Div., 340 E. 131st St., Cleveland 8, Ohio—Booths 954-956-958-960.

In attendance: R. S. Lane, D. W. LaRue, H. A. Mueller, D. W. Norris, G. J. Olney, H. H. Lane, R. J. Tuholske, W. C. Blake, R. C. Tisch, F. A. Bilger, D. A. Stock, A. J. Schuh, S. H. Kelly, L. C. Moir, L. C. Fairchild, E. C. Reich, E. R. Lee.

Exhibiting: Automatic bin-feed, ash removal stokers and winter air conditioner.

POWER PLANT SUPPLY CO., 1120 Chester Ave., Cleveland 14, Ohio—Booth 745.

In attendance: Wm. E. Berrington, Wm. R. Berrington, James Crawford, Ed. Harbath, H. J. Willims.

Exhibiting: Pumps; steam specialties; boilers.

PREFERRED UTILITIES MFG. CORP., 1860 Broadway, New York 23, N. Y.—Booths 37-38.

In attendance: R. S. Bohn, J. S. Kaplan, F. B. Sale.

Exhibiting: 10 hp and 20 hp unit steam generators with 2-pass and 4-pass construction, respectively; horizontal rotary oil burner. These steam generators "are portable, oil fired, fully-automatic steam generating units with guaranteed thermal efficiency of well over 75 per cent. The new line of oil burners have capacities from 12 to 150 gph, with heavy oils, including the catalytic residual oils."

PREMIER BURNER CO., 8816 Harkness Rd., Cleveland 6, Ohio.—Booth 588.

In attendance: I. L. Rosen, B. D. Brown.

Exhibiting: Gas conversion burner.

PRODUCTS RESEARCH CO., 634 S. Western Ave., Los Angeles 5, Calif.—Booth 596.

In attendance: B. B. Steel and W. L. Powell.

Exhibiting: "Chromlock" gasketing; "Proseal" sealing compound.

PYLE NATIONAL CO., 1334 N. Kostner Ave., Chicago 51, Ill.—Booth 615.

In attendance: Mel J. Stevenson, A. M. Fenwick, J. V. Baker, Robert B. Donald.

Exhibiting: "Multi-Vent" for no draft air distribution; turbines; flood lights.

QUAKER MFG. CO., 223 W. Erie St., Chicago 10, Ill.—Booths 51-53.

In attendance: A. T. Atwill, O. J. Long, D. J. Howard, J. McClintock.

Exhibiting: Oil-burning furnaces and conversion burners.

RANDALL GRAPHITE PRODUCTS CORP., 609 W. Lake St., Chicago 6, Ill.—Booths 359-361.

In attendance: M. E. Clark, E. A. Lampe, K. W. Strunk, K. E. Whiteley.

Exhibiting: Pillow blocks and graphited bronze bearings.

RAYTHEON MFG. CO., INDUSTRIAL ELECTRONICS DIV., Waltham 54, Mass.—Booth 582.

In attendance: I. C. Brown, L. P. Lamb, R. N. Hobson, K. W. McKenzie, T. D. Price, L. F. Sargent.

Exhibiting: Room unit precipitator; washer type home unit; industrial package unit; industrial unit-manual; 200 and 400 watt power supplies.

REDMOND CO., INC., Owosso, Mich.—Booth 526.

In attendance: Glenn Baumhardt, W. R. Fox, James Tweedy, R. T. Abrell.

Exhibiting: Fractional horsepower electric motors, sold under the name "Micromotors" and varying in sizes from 1/200th to 1/25th hp; small blowers, both single and dual units and speed controllers for use with these motors; cutaway motor running under water.

RESEARCH PRODUCTS CORP., 1015 E. Washington Ave., Madison 3, Wis.—Booth 586.

In attendance: M. H. Kliefoth, A. W. Brown, B. T. Cunningham, J. G. Schutz.

Exhibiting: Replaceable air filters; washable air filters; grease filters; filter "Watchman."

REZNOR MFG. CO., Mercer, Pa.—Booths 364-366.

In attendance: G. F. Reznor, D. R. Webster, M. G. Endres, G. W. Reznor, W. W. Amon, W. C. Schodlatz, R. A. Narlee.

Exhibiting: Gas unit heaters, suspended and floor types.

RHEEM MFG. CO., 570 Lexington Ave., New York 22, N. Y.—Booths 864-866-868-872-963-965-971.

In attendance: F. J. Nugent, C. L. Hewitt, Jr.

Exhibiting: Floor furnace; console heater; wall heater; attic fan; evaporative cooler; oil space heater; booster water heater; 250 lb hopper model; bin base stoker; bin feed stoker; 35 lb stoker, transmission gears.

RHOADS & SONS, J. E., 35 N. Sixth St., Philadelphia 6, Pa.—Booths 533-535.

In attendance: J. Edgar Rhoads, Richard H. Rhoads, Carl H. Tildes, Kenneth McClelland, Samuel L. Allen, Carl D. Wright, L. K. Bloor, W. J. Damm, W. A. Garrison.

Exhibiting: "Tannate" leather belting and packings; "Tannate Rockwood" drive with hand brake for applying load to the belt; leather belt cement; leather belt preserver; miscellaneous mechanical leather products.

RICHMOND RADIATOR CO., 19 E. 47th St., New York 17, N. Y.—Booth 128.

In attendance: R. L. Clewell, A. A. Marks, R. O. Pallin.

Exhibiting: "Heatomat" gas boiler; gravity furnace, gas fired; gas winter air conditioner; "Richvar" convector type radiator.

RIC-WIL CO., 1562 Union Commerce Bldg., Cleveland 14, Ohio—Booth 562.

In attendance: W. L. Bartel, G. P. O'Connor, C. W. Wheeler, W. F. Wood, W. F. Wieman, H. W. Roskilly, E. S. Pandy, C. G. Van Schoor, H. F. Wustman.

Exhibiting: Full-size samples of conduit for the distribution and insulation of steam, oil, hot water, or refrigerated process liquids—insulated pipe units, cast iron conduit, and supertile conduit; pictures of installations in industry, airports, housing groups, and entire communities where central heating has proved advantageous.

RIDGE TOOL CO., Elyria, Ohio—Booths 951-953.

In attendance: W. L. Parcell, C. H. Ingwer, J. Frates, M. Fried.

Exhibiting: Complete line of pipe tools.

ROBERTS-GORDON APPLIANCE CORP., 137 Arthur St., Buffalo 7, N. Y.—Booths 759-761.

In attendance: W. S. Gordon, Jr., J. C. Bowery, L. C. Smyth, R. I. Warnecke, R. E. Landers.

Exhibiting: "Gordon" spreader flame conversion burners; "Nordensson" industrial and commercial burners.

ROME-TURNEY RADIATOR CO., Rome, N. Y.—Booth 465.

In attendance: E. L. A. Forster, E. J. Parry, J. M. Shannon, D. L. McDonald, W. L. Lynch.

Exhibiting: Convectors and concealed copper radiation; extended finned surface for heat transfer.

RUSSELL CO., F. C., 6400 Herman Ave., Cleveland, Ohio—Booths 772-776-778.

In attendance: J. J. Morganstern, C. C. Schuetz, B. D. Algie, W. L. Mayer, R. M. Burns, P. C. McCormick, J. F. Fudge, J. C. Colebrook.

Exhibiting: "Rusco" all-metal self-storing combination screen and storm sash; "Thermoseal Three In One" combination screen and storm sash; all-metal venetian awnings; water repellents.

RUTLEDGE BOILER CO., P. O. Box 478, Morganton, N. C.—Booth 514.

In attendance: R. W. Rutledge.

Exhibiting: Steel water tube heating boiler.

SAMPSEL TIME CONTROL, INC., 600 N. Strong Ave., Spring Valley, Ill.—Booth 653.

In attendance: T. C. French, E. L. Miller, F. M. Eversden.

Exhibiting: Heating controls.

SARCO CO., INC., 475 Fifth Ave., New York 17, N. Y.—Booth 451.

In attendance: E. J. Ritchie, R. W. Cumming, L. Barfus, J. L. Frisse, J. Christman.

Exhibiting: Complete line of steam and hot water heating specialties, including weather control systems; industrial steam traps; temperature regulators; strainers; liquid level controls; new small steam and water mixer for isolated wash rooms and showers in factories; new combined pressure-temperature regulator for water heaters; electro-hydraulic motor valves for temperature and pressure control.

SCHILD MFG. CO., 739 N. Broadway, Milwaukee 2, Wis.—Booth 970.

In attendance: H. F. Schild.

Exhibiting: All-purpose metal cutting tool.

SCIENTIAE CORP., 101 Pine St., Dayton 2, Ohio—Booth 968.

In attendance: G. H. McConaughy, W. P. Possel, F. W. Heckert.

Exhibiting: "Spiralok" adjustable V-belt pulleys, which lock onto the shaft without keys, pins, or set screws; this feature also adapted to machine parts other than pulleys.

SHEET METAL WORKER, 45 W. 45th St., New York 19, N. Y.—Booth 365.

Exhibiting: Publication.

SKILSAW, INC., 5033 Elston Ave., Chicago 30, Ill.—Booths 669 & 673.

In attendance: Frank M. Goodman, J. Edmund Watwood.

Exhibiting: Portable electric "Skil" tools (shear, nibbler, saw, drill, sander, and grinder).

SKUTTLE MFG. CO., 517 E. Larned St., Detroit 26, Mich.—Booth 978.

In attendance: A. L. Evans, Geo. T. Greulich.

Exhibiting: Humidifiers.

SMITH CORP., A. O., 3533 N. 27th St., Milwaukee, Wis.—Booth 922.

In attendance: J. Dilot, W. F. Manthei, H. E. Bilsborough, B. F. Armstrong, R. H. Stoll, T. O. Lawler, E. W. Brown.

Exhibiting: "Smithway" stokers.

SMITH CO., INC., H. B., Westfield, Mass.—Booth 539.

In attendance: G. O. Allbee, J. E. Reed.

Exhibiting: "Mills" cast iron boilers for commercial, industrial, and institutional construction.

SNIPS MAGAZINE, 5707 W. Lake St., Chicago 44, Ill.—Booth 512.

Exhibiting: Publication.

SPENCER THERMOSTAT CO., METALS AND CONTROLS CORP., 34 Forest St., Attleboro, Mass.—Booths 646-648.

See Metals and Controls Corp.

STREAMLINE PIPE & FITTINGS DIV., MUELLER BRASS CO., Port Huron, Mich.—Booth 518.

See Mueller Brass Co.

STRONG, CARLISLE & HAMMOND CO., 1392 W. Third St., Cleveland 13, Ohio—Booth 337.

In attendance: R. L. Clark, H. H. Malthie.

Exhibiting: Steam traps, regulating valves, strainers, separators; booth designed around new "in-line" series traps.

STURTEVANT CO., B. F., DIV. OF WESTINGHOUSE ELECTRIC, Hyde Park, Boston 36, Mass.—Booths 760-762-764-766.

In attendance: Harold Hickock, Philip Cohen, F. F. Morse, R. R. Morse, E. J. Kuhn, W. F. D. Neihaiser, Charles Koper, William Nelden, Gale Huggins, A. C. Bartlett, J. C. Thompson, Walter Goodwin, R. W. Sigmund, C. A. Pavey, E. C. Hach, P. H. Grunnagle, F. G. Hickling.

Exhibiting: Air conditioning, air cleaning, and air handling equipment.

SUNDSTRAND MACHINE TOOL CO., PUMP DIV., Rockford, Ill.—Booth 683.

In attendance: B. F. Olson, W. A. Kemp, C. W. Lang, H. O. Wahlmark, W. R. Kiefer, W. A. Ahlgren, J. M. Kjellstrom.

Exhibiting: Various models of fuel units and fuel pumps for domestic oil burners with some units in operation and others showing internal mechanisms through cutaway models; two motion displays showing flow of oil through pumping unit, with oil pressure indicated by different colors.

SUN-FIRE STOKER CORP., New Albany, Ind.—Booth 859.

SURFACE COMBUSTION CORP., 2375 Dorr St., Toledo 1, Ohio—Booths 754-756-758-853-855-857.

In attendance: F. H. Adams, C. B. Phillips, E. A. Weaver, J. I. Trimble, L. W. Sutherland, L. Wilcox, John Denise, John Corsiglia, F. S. Hamer, H. C. Gurney, H. M. Heyn, L. J. Monahan, H. E. Hicks, F. J. Lilly, K. G. Hull, N. B. Buehrer, R. A. Caylor, Horace Gates, C. B. Charmatz, T. J. Langan, W. J. Grover, R. B. Hitchcock.

Exhibiting: "Janitrol" triple service system (new) with side panels of lucite for display; gravity furnace (new); "Upshot" and "Inshot" conversion burners; winter air conditioner (front panels of lucite for display); gas boilers; unit heaters; "Thermo" attic unit; scale models of newly expanded Columbus plant and laboratory complete with models of machinery and equipment; dealer identification booth; house models displaying various applications of hot water and warm air radiant panel heating.

SYNCHROMATIC CORP., Watertown, Wis.—Booths 59-61.

In attendance: R. C. Jaye, H. M. Stillman, J. S. Sullivan, G. L. Day, W. O. Kobin, J. R. McDermott.

Exhibiting: Gravity and forced air coal fired units; oil fired units; "Hiboy" and basement type gas fired units; gun type oil burner.

TACO HEATERS, INC., 342 Madison Ave., New York 17, N. Y.—Booths 333-335.

In attendance: E. T. Houlihan, Joseph R. Murphy, Joseph Balter.

Exhibiting: Indirect water heaters; water circulators; venturi fittings; tempering valves; relief valves; reducing valves; several new items.

TEMP-CONTROL, INC., 208-210 E. State St., Peoria, Ill.—Booths 589-591.

In attendance: L. Landwirth, S. Bernstein, Mrs. S. Bernstein, L. O. Peterson.

Exhibiting: Mechanical air conditioning; evaporative condensers; "Jaden" water cooled air conditioning.

THERMOSEAL DIV., F. C. RUSSELL CO., 1836 Euclid Ave., Cleveland 15, Ohio—Booths 772-776-778.

See Russell Co., F. C.

TIMKEN SILENT AUTOMATIC DIV., TIMKEN-DETROIT AXLE CO., 100 Clarke Ave., Detroit 32, Mich.—Booth 251.

In attendance: T. A. Crawford, M. A. Powers, Ralph Hooke, L. H. Holman.

Exhibiting: Conversion type oil burners; oil furnace units; oil boiler units; oil burning water heaters.

TINNERMAN PRODUCTS, INC., 2018 Fulton Rd., Cleveland 13, Ohio—Booth 560.

In attendance: A. H. Tinnerman, G. A. Tinnerman, W. M. Buttriss, E. W. Misamore, H. W. Chapek.

Exhibiting: "Speed Nuts"; "Speed Clips"; "Speed Clamps."

TORRIDHEET DIV., CLEVELAND STEEL PRODUCTS CORP., 7306 Madison Ave., Cleveland, Ohio—Booths 178 & 277.

In attendance: R. J. Lucas, H. M. Hildebrandt, W. J. Smith, Jr., L. F. Dienst, J. L. O'Brien, Leslie D. Clough, J. F. Donnelly, J. A. Lappin, W. J. Watchler.

Exhibiting: 1947 models of gun and wall flame conversion burners, oil-burner boilers, winter air conditioning units, furnaces, etc.

TORRINGTON MFG. CO., 70 Franklin St. Torrington, Conn.—Booth 501.

In attendance: D. G. Leslie, H. M. Risedorf, R. T. Lyman.

Exhibiting: "Airistocrat" propeller fan blades; "Airotor" blower wheels.

TRANE CO., La Crosse, Wis.—Booths 66-68-70.

In attendance: G. E. Hicke, R. E. Lee, M. L. Hoglund, D. Bloomquist, C. L. Ringquist, B. Priest, K. Zurn, F. O. Russell, P. L. Moltzau, A. L. Kaulfuss, L. Fuller, E. A. Cline, R. Knowles, H. C. Rooks, A. Lokken, R. G. Lubinsky, R. Whitney, T. Ernst, H. Mutch, R. H. Anderegg, R. E. Lucey, T. Weisbecker, W. Roscoe, O. A. Labus, J. Hill, R. Miner.

Exhibiting: Heating coils; cooling coils; special heat transfer surface; reciprocating compressor; centrifugal compressor; self-contained unit; propeller unit heater; projection unit heater; centrifugal fan; "Climate Changer"; "Custom-Air" unit; unit ventilator; hot water specialties; steam heating specialties; dry expansion chiller; blower type unit heaters; wall fin heater; pumps; convector-radiators; evaporative condenser.

TRERICE CO., H. O., 1420 Lafayette Blvd., Detroit 16, Mich.—Booth 920.

TRIPLEX HEATING SPECIALTY CO., P. O. Box 33, Peru, Ind.—Booth 564.

In attendance: L. H. Wise, W. F. Petty, L. R. Peters.

Exhibiting: Complete line of hot water specialties.

TURNBULL HEATING CO., 9930 Freeland Ave., Detroit 27, Mich.—Booths 972-974.

TUTHILL PUMP CO., 939 E. 95th St., Chicago 19, Ill.—Booth 946.

In attendance: G. B. Tuthill, H. T. Kessler, W. J. Wagner, J. D. Young, P. J. Endebak, W. F. Rye, W. Fleming.

Exhibiting: Oil burner pumps and fuelstats, domestic and industrial.

TUTTLE & BAILEY, INC., Corbin Ave., New Britain, Conn.—Booth 464.

In attendance: Stanley Hart, J. H. Smart, L. Zavorski, J. F. Wolff, R. D. Tutt, C. S. Backgren, H. H. Van Epps, R. S. Rickabaugh.

Exhibiting: Grilles; registers; air control devices; "Aerofuse" ceiling diffusers; copper convectors.

UNITED STATES AIR CONDITIONING CORP., Como Ave., S. E., at 33rd St., Minneapolis 14, Minn.—Booth 665.

Exhibiting "usAIRco" unit heater (new design, with "Deflecto-Grille"); refrigerated "Kooleraire," 3 ton capacity; room ventilator; blower; unit air conditioner; blast heat coil.

UNITED STATES RADIATOR CORP. and PACIFIC STEEL BOILER DIV., 1500 United Artists Bldg., Detroit 31, Mich.—Booths 856-858-860.

In attendance: V. W. Blackney, R. F. Connell, A. J. Reebel, H. B. Steggall, E. J. Grady.

Exhibiting: "Capitol" and "Sunray" gas and oil boilers; "Pacific" steel boilers; plate flue boilers; "Capitolaire" conditioner; "Capitol ThinTube" radiators; standard fin-pipe radiator.

UNITED STATES REGISTER CO., Battle Creek, Mich.—Booths 556-558.

In attendance: A. A. Stagg, H. G. Hollman, E. P. Kromdyk.

Exhibiting: "U. S." gravity registers and faces; air conditioning registers and grilles; accessories.

UNITED STATES TESTING CO., 1415 Park Ave., Hoboken, N. J.—Booth 9.

UNIVERSAL C.I.T. CREDIT CORP., 1 Park Ave., New York, N. Y.—Booth 862.

In attendance: A. G. Rude, F. J. Welsh, G. W. Keiper, H. C. Anderson, Eugene Thomas, J. F. Campbell, James Carnegie, W. R. Ryan, L. E. Strang.

Exhibiting: Wholesale and retail sales financing.

UTILITY APPLIANCE CORP., 4851 S. Alameda St., Los Angeles 11, Calif.—Booths 595-597.

In attendance: B. B. Breslow, E. Lester Cutting, Leo Hungerford.

Exhibiting: Blowers; fans; evaporative air coolers; gas-fired furnaces (floor, dual and forced air); new blower wheel; stamped steel furnace burner.

VIKING AIR CONDITIONING CORP., 5600 Walworth Ave., Cleveland 2, Ohio—Booths 433-435.

In attendance: Marion I. Levy, Frank P. Gibbons, Malcolm Mackenzie.

Exhibiting: Furnace blower assemblies; wheels and housings; humidifiers and humidifier parts; attic fans.

VIKING MFG. CORP., 1747 Chester Ave., Cleveland 14, Ohio—Booth 166.

In attendance: H. S. Frasher, P. B. Patton, J. G. Baker, L. H. Gary, W. R. Jones, J. L. Mahoney, T. C. Kitchen, W. P. Loer, M. C. Cameron.

Exhibiting: Year 'round air conditioning unit; oil and gas furnaces; stoker; oil fired water heater; oil fired space heater; oil and gas floor furnaces; reach-in refrigerator; room cooler; water cooler; condensing units; oil conversion burner.

VIKING PUMP CO., Cedar Falls, Iowa—Booth 504.

In attendance: Cecil W. Downing, Stanley A. Petersen.

Exhibiting: Oil burner units and pumps; truck pumps; bulk station pumps.

WALTON LABORATORIES INC., 1186 Grove St., Irvington, N. J.—Booths 566-570.

WATERFILM BOILERS, INC., 154 Ogden Ave., Jersey City 7, N. J.—Booth 851.

In attendance: Arthur R. Hanson, E. K. Wodecka.

Exhibiting: Gas and oil fired steel boilers.

WATERMAN-WATERBURY CO., 1121 Jackson St., N. E., Minneapolis, Minn.—Booth 348.

In attendance: B. D. Watchler, Frank McConnell, Jack White, James Bazille, Stuart Smith, Brighton Eddy.

Exhibiting: Heating equipment—coal, gas, and oil fired.

WATTS REGULATOR CO., Lawrence, Mass.—Booth 629.

In attendance: B. E. Horne, W. M. Dillon, A. J. Harvey, Jr.

Exhibiting: Relief valves; pressure reducing valves; water tempering devices; hot water heating systems; boiler water feeders; low water cutoffs; steam regulator specialties.

WEBSTER ELECTRIC CO., Clark and DeKoven, Racine, Wis.—Booths 830-832.

In attendance: E. M. Ford, B. Wiechers, D. J. Munroe, H. Osborne, L. Ehrich, K. J. Norman.

Exhibiting: Fuel unit; transformer; "Thermodrive" variable pulley for blower speed control; fuel unit with magnetic cutoff; cut-away oil furnace showing operation of the new thermodrive through the heating cycle will be featured.

WEBSTER & CO., WARREN, Camden, N. J. —Booths 147-149-151.

In attendance: H. F. Marshall, N. W. MacNichol, R. E. Lawton, L. H. Plum, B. F. Lerch, D. F. Bennett, C. G. Binder, C. J. Kern.

Exhibiting: Heating systems and equipment, including steam heating and process specialties; "Moderator" control systems; radiation; baseboard heating; "Webster-Nesbitt" unit heaters.

WEIL-McLAIN CO., Michigan City, Ind.—Booth 447.

In attendance: H. G. Brenner, N. E. Westphal, R. M. Stockwell.

Exhibiting: Concealed "Raydiant" radiator; "Solray" radiator; boilers.

WEINMAN PUMP MFG. CO., 290 Spruce St., Columbus, Ohio—Booth 745.

In attendance: E. D. Bader, D. G. Lear.
Exhibiting: Centrifugal pumps.

WESTINGHOUSE ELECTRIC CORP. — Booths 760-762-764-766.

See Sturtevant Co., B. F., Div. of Westinghouse Electric.

WHEELING FURNACE CORP., Martins Ferry, Ohio—Booth 511.

In attendance: E. W. Stifel, John Waterhouse, R. C. Fair, H. T. Harrington, D. M. Bugsby, J. T. Lennon, A. Paull Hubbard.

Exhibiting: "Radiant Tuberator" warm air furnace.

WHITE MFG. CO., 2362 University Ave., St. Paul 4, Minn.—Booth 443.

In attendance: L. E. Turner, David E. White, Charles E. White.

Exhibiting: Damper regulators; blower controls.

WHITE-RODGERS ELECTRIC CO., 1209 Cass Ave., St. Louis 6, Mo.—Booth 172.

In attendance: L. F. Blough, Jack Searls, Edw. C. Robinson, P. L. Tolerton, Ray Schmitz, Chas. P. Taber, Steve Luther, H. O. McDowell, E. E. Harwood, D. O. Eggert.

Exhibiting: Complete line of automatic controls for both heating and air conditioning; refrigeration temperature controls operated by hydraulic action "which gives these controls many desirable features"; refrigeration pressure controls with direct reading dials in pounds pressure and inches of vacuum.

WHITTINGTON PUMP & ENGINEERING CORP., 245 S. Meridian St., Indianapolis 4, Ind.—Booth 238.

In attendance: W. P. Whittington, Geo. C. Joslin, Dick Whittington, Clyde Brown.

Exhibiting: Vacuum heating pump; junior condensation pump; high pressure boiler feed pump; vacuum process pump; "Hydro-Scavenger" (demonstration) sludge handling; "Handivac" portable vacuum process pump; automatic sewage eductor (demonstration), first showing.

WILL-BURT CO., Orrville, Ohio—Booth 632.

In attendance: B. G. Cope, E. G. Baer, R. W. McFadden, J. R. Furth, A. L. Baumgartner, William B. Baer, J. R. Luellen, Charles Hodgson, E. W. Krieble.

Exhibiting: Hopper model automatic coal stoker.

WILLIAMS OIL-O-MATIC DIV., EUREKA WILLIAMS CORP., 1201 E. Bell, Bloomington, Ill.—Booths 753-755-757.

WILLOUGHBY MACHINE & TOOL CO., 15 Second St., Willoughby, Ohio—Booths 578-580.

WILSON & CO., INC., AIR FILTER DIV., 4100 S. Ashland Ave., Chicago 9, Ill.—Booth 984.

In attendance: C. W. Becker, A. C. Andresen, R. E. Cooper, Harold Winningham, Neil M. Reisdorph, T. L. Osberger.

Exhibiting: "Spider-Web" and "Edgeseal" throwaway natural hair filters.

WING MFG. CO., L. J., 154 W. 14th St., New York 11, N. Y.—Booth 747.

In attendance: Harry S. Wheller, C. H. Smith, Theo. Schenke, A. C. Danks, F. Morrison, G. M. Comstock, Don Campbell, W. G. Butler, H. C. Roller, W. C. Roseberry.

Exhibiting: Revolving unit heater, turbine driven; auxiliary turbine with reduction gear; turbine and motor driven forced draft blowers for windbox mounting, thus eliminating duct work; axial flow fans for forced draft and ventilation; draft inducer for inserting directly in boiler breeching or chimney top.

WOLVERINE TUBE DIV., 1411 Central Ave., Detroit 9, Mich.—Booth 507.

In attendance: A. S. Kingerley, R. C. Yantis, V. D. Steele, J. A. Marshall, W. H. Maxwell, H. A. Harty.

Exhibiting: Seamless copper and brass tubes; "Lintern Aire-Rectifier" featuring "Trufin" integral finned tube.

WOOD INDUSTRIES, INC., GAR, Wayne, Mich.—Booths 142 & 241.

In attendance: Oscar Berg, Thomas F. Brady, George Cormack, A. E. Dansereau, Byron Failing, Lowell Madden, Louis A. Humrich, D. M. Kagay, Frank J. Hughes.

Exhibiting: "Tempered Aire" oil fired and gas fired heating units; boiler burner units; conversion burner, oil fired.

WORTHINGTON PUMP & MACHINERY CORP., Harrison, N. J.—Booths 642-644-741-743.

In attendance: W. F. Bishop, P. H. Shaw, M. M. Lawler.

Exhibiting: Centrifugal compressor; self-contained air conditioner; "Freon" refrigeration unit; ammonia refrigeration unit; evaporative condenser.

"X" LABORATORIES, INC., 25 W. [illegible]th St., New York 19, N. Y.—Booth 23.

In attendance: Parke H. Holton, L. D. [illegible]tterson.

Exhibiting: Boiler liquid; boiler powder; flush "Rustoff" treatment; "Pipejoin."

YARNALL-WARING CO., Chestnut Hill, Philadelphia 18, Pa.—Booth 617.

In attendance: Jos. Kildare, A. L. Aich[illegible], J. A. Steer, D. T. Newman, Robert Goodman, Wm. R. Moore, Carl G. Liberg, Jr. H. S. Webster, John F. O'Brien, B. R. Bristol, J. K[illegible]per.

Exhibiting: "Yarway" boiler trim, including [illegible] off valves, water columns and gages, and remote water level indicators; "Gun-[illegible]" expansion joints; impulse steam traps and fine screen strainers; operating display of remote water level indicator with separate "Hi-Lo" alarm signals, visible and audible type; 15 minute color film, "Making Steam Trap History."

YORK CORP., York, Pa.—Booth 152.

In attendance: F. C. Wood, J. M. Lambert, J. R. Hertzler, W. S. Stair, M. G. Munce, J. Donald Smith, J. C. Consley, H. A. Brysselbout, B. F. James, M. S. Lebair, H. S. Yoder, G. O. Wendel, L. W. Cordrey, F. J. Goff, C. G. Gillespie, D. J. Wood, L. R. Craig, L. Lewis, L. P. Quinlivan, C. J. Schurman, J. A. Schurman, A. P. Wolff, W. P. Kohn, J. O. Currie, H. L. Hupp, B. C. Reeder, W. H. West, Leon E. Kinley.

Exhibiting: Complete line of air conditioning and refrigeration equipment with emphasis on [illegible] compressor systems.

YORK-SHIPLEY, INC., York, Pa.—Booths 664-666-668-672-676-678-862.

In attendance: S. H. Shipley, V. Lazo, E. T. Nahill, Arthur Padou, E. C. Alft, R. P. Babcock, Al Raver, G. D. Frank, C. H. Keady, W. S. Tallon.

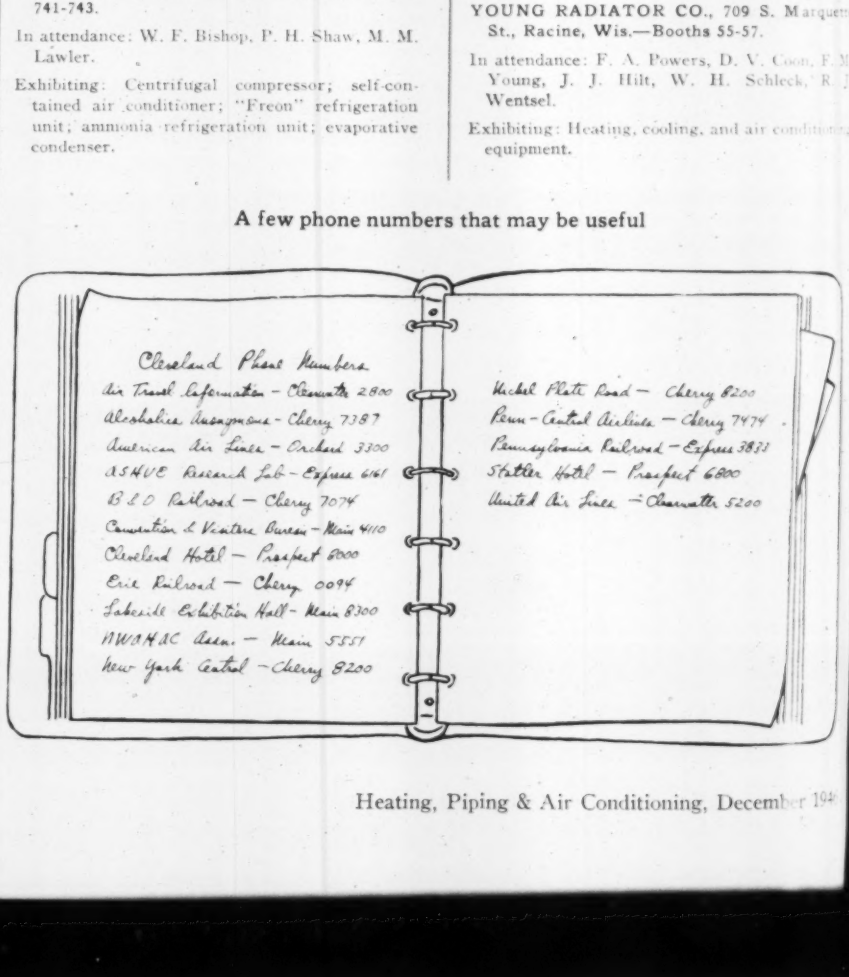
Exhibiting: Domestic oil-fired boiler-burner units; domestic oil-fired winter air conditioners; vaporizing type oil-fired water heaters; oil-fired conversion burners; horizontal rotary oil burners; "Steam-Pak" steam generators.

YOUNG RADIATOR CO., 709 S. Marquette St., Racine, Wis.—Booths 55-57.

In attendance: F. A. Powers, D. V. Coon, F. M. Young, J. J. Hilt, W. H. Schleck, R. J. Wentsel.

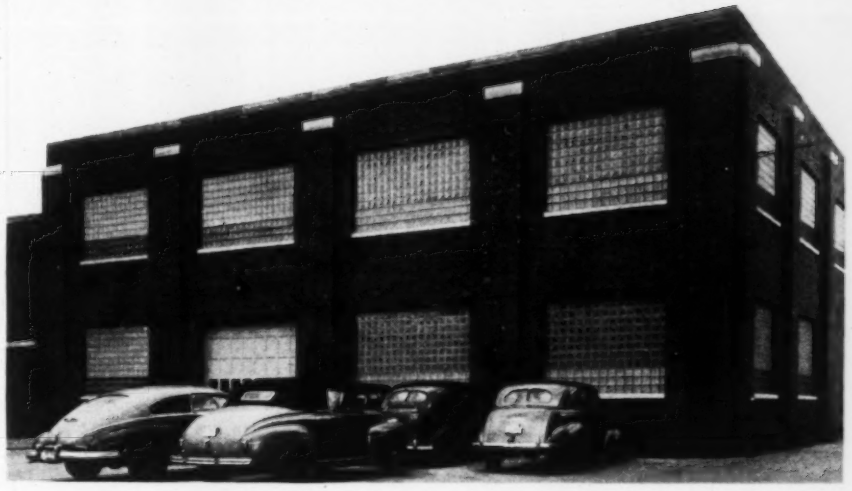
Exhibiting: Heating, cooling, and air conditioning equipment.

A few phone numbers that may be useful


Cleveland Phone Numbers
Air Travel Information - Clearwater 2800
Alcoholics Anonymous - Cherry 7387
American Air Lines - Orchard 3300
ASHVE Research Lab - Express 6161
B & O Railroad - Cherry 7074
Convention & Visitors Bureau - Main 4110
Cleveland Hotel - Prospect 8000
Erie Railroad - Cherry 0094
Fabacraft Exhibition Hall - Main 8300
NWSHAC Assn. - Main 5551
New York Central - Cherry 8200
Nickel Plate Road - Cherry 8200
Penn-Central Airlines - Cherry 7474
Pennsylvania Railroad - Express 3833
Statler Hotel - Prospect 6800
United Air Lines - Clearwater 5200

Cleveland Has Many Air Conditioning Jobs of Interest

Lester T. Avery Tells What's Done With Air In and Around Host City for January Exposition



Jack & Heintz has a windowless building at Bedford with complete conditioning at low humidities for assembly work

BIGGEST THING airwise in the Cleveland area is the wind tunnel and associated equipment in the development for the National Advisory Committee for Aeronautics near the airport. This plant includes many different kinds of air conditioning and is expected to be on the program for an inspection trip for the 53rd annual meeting of the ASHVE.

The wind tunnel uses 14 centrifugal refrigerating machines, each driven by a 1500 hp motor, completely interconnected with cooling coils in the altitude wind tunnel—a "Freon 12" refrigeration cycle. This equipment is designed to have not less than 6700 tons refrigeration capacity when operating under maximum design conditions of the tunnel and when cooling to minus 4 F under 30,000 ft altitude conditions at the test section; the capacity is 3350 tons when operating at a minus 40 F minimum air temperature leaving the coil. Twenty-six thousand gallons per minute of condenser water is circulated through the condensers. The coil section in the wind tunnel is 50 ft in diameter.

One thousand and fifty horsepower in 14 "Freon 12" units is required for cooling the air used in the make-up for the tunnel. This air is dried in a special activated alumina dehumidifier. Fourteen ammonia machines are employed for chilling air to minus 85 F for carburetor testing. There is a low temperature, high altitude test chamber to go down to minus 100 F. Many smaller units for conditioning air in various laboratories and test rooms are also used. Altogether, there is over 25,000 hp connected to refrigeration load in this laboratory — almost equalling the total connected air conditioning horsepower for all comfort applications as reported by members of the Air Conditioning Association of Cleveland.

Nearly 30,000 Hp for Comfort Air Conditioning

This contractor association reports 29,276 hp as of October 1946, embracing 1173 installations, exclusive of room coolers and industrial process work. It would be impractical and uninteresting to detail all of these jobs but we can pick out a few in each classification that may be significant for some special type or arrangement of equipment. No effort has been made to include these in the inspection trips planned for the last week in January, but if the visitor is sufficiently interested he will find it easy to make his own arrangements for getting into any particular plant. We thumbnail here a few items that may help in selecting which installations—if any—you wish to see while attending the International Heating, Ventilating and Air Conditioning Exposition and the ASHVE's annual meeting. Obviously, but a few of the 1173 can be mentioned, and many important ones will have to be omitted.

Theaters—The first important commercial air conditioning in Cleveland was done in the theaters in the middle 1920's. Keith's Palace and the Hippodrome have direct expansion carbon dioxide systems, with coils in washers so popular in those days. The Stillman, State and Allen have the centrifugal type which uses chilled water circulating to air washers. The more recent neighborhood houses have the conventional type of direct expansion "Freon" machines with water cooled or evaporative condensers. A few water and ice storage systems have been made and there are a number of straight evaporating cooling jobs without any refrigeration. Thus Cleveland offers a rather complete diversification in theater cooling.

IF YOU WILL—or if you won't—be in Cleveland next month for the International Heating, Ventilating, and Air Conditioning Exposition you'll find this summary of the kinds of air conditioning installations in that area a helpful review of current practice. Mr. Avery, president of Avery Engineering Co. of that city, discusses what is done with air in theaters, stores, hotels, offices, and plants.

Stores—In the larger department stores, Higbee's has a CO_2 direct expansion plant of 1200 tons capacity for the lower floors. The May Co. uses centrifugals in a number of installations and has an interesting arrangement of air distribution on the upper floors, the main outside air conditioner being on the roof and distributing make up air to recirculating units on each floor. Woolworth, Kresge, W. T. Grant, Bond, Richman, and many other smaller stores and shops are conditioned with conventional "Freon 12" systems.

Many different air distribution methods have been used; there seems to be a need for better designed air systems for stores but very little new work of this type has been done in Cleveland. The M. O'Neil stores in Akron, Massillon, Coshocton and Mansfield, and Polsky's and Yeager's in Akron offer more that is new, as this work was done in 1946. These cities are within 100 miles of Cleveland and a side trip might be worth while to any one particularly interested in store air conditioning.

Hotels—Cleveland hotels are largely conditioned insofar as their restaurants and some public rooms are concerned. Here again you find all kinds: CO_2, "F-12," small units, large plants, washers, dry coils—anything and everything. The better restaurants are of course conditioned, mostly with the conventional "F-12" direct expansion units. Clark's Colonial combines a silica gel dehumidifier with a compressor installation, while Crosby's at 105th and Carnegie combines lithium chloride dehumidification with a compressor. Stouffer's (at Shaker Square) is a fine new job with excellent air distribution, electrostatic air cleaning, and many interesting installation features.

Offices—Some of the better office air conditioning is in the industrial plants a little out from downtown Cleveland. Warner and Swasey, Cleveland Twist Drill, Cleveland Pneumatic Tool, and S. K. Wellman, have direct expansion installations with very special air systems, and tie in with winter heating. Bryant Heater has a new installation that includes silica gel dehumidifier with electrostatic air cleaning and an "F-12" condensing unit. The Bryant laboratory also has panel heating pipes in the floor and perforated ceiling distribution of conditioned air.

One of the earlier users of air conditioning was the Cleveland Electric Illuminating Co., which has a fine customers' room and a suite of offices on the upper floor. Ohio Bell has its main floor business office conditioned. The Federal Reserve Bank has two floors conditioned. Dresser Industries' new main office in the Terminal Tower building is conditioned with a mixing damper system, silica gel dehumidifier, "F-12" compressor, electrostatic air cleaner, and ceiling air distribution.

The problem of coordinating the old heating systems with complete air conditioning—particularly where the radiation is oversize and where there is little or no automatic heating control—has been handled in many different ways. In office work the conditioning must be carried over into the year 'round system or there is trouble. The above jobs are all the year 'round type and may demonstrate some good and some not so good methods and control.

Nela Park—An inspection trip is scheduled for the Home Lighting Institute at Nela Park. This building is most interesting and is air conditioned.

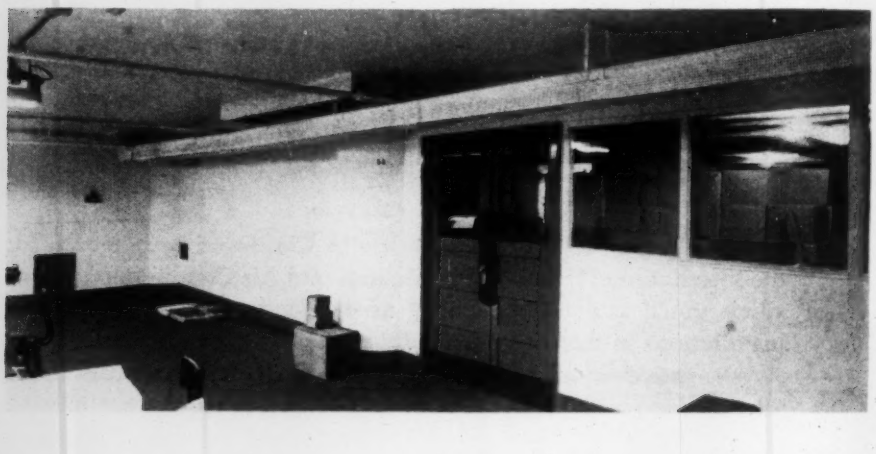
Industrial Air Conditioning for Process Work

Process—Industrial air conditioning is employed in a number of plants. Industrial Rayon, both at Cleveland and Painesville, has several kinds of refrigeration and air conditioning. The Painesville plant was new and on the inspection trip schedule in 1940; the Cleveland plant has recently been remodeled and modernized. Jack & Heintz Precision Industries has a windowless building at Bedford with complete conditioning at low humidities for assembly work; they use lithium chloride dehumidification, "F-12" refrigeration, and activated carbon for solvent fume removal. Jack & Heintz also has a windowless office building and other spaces conditioned.

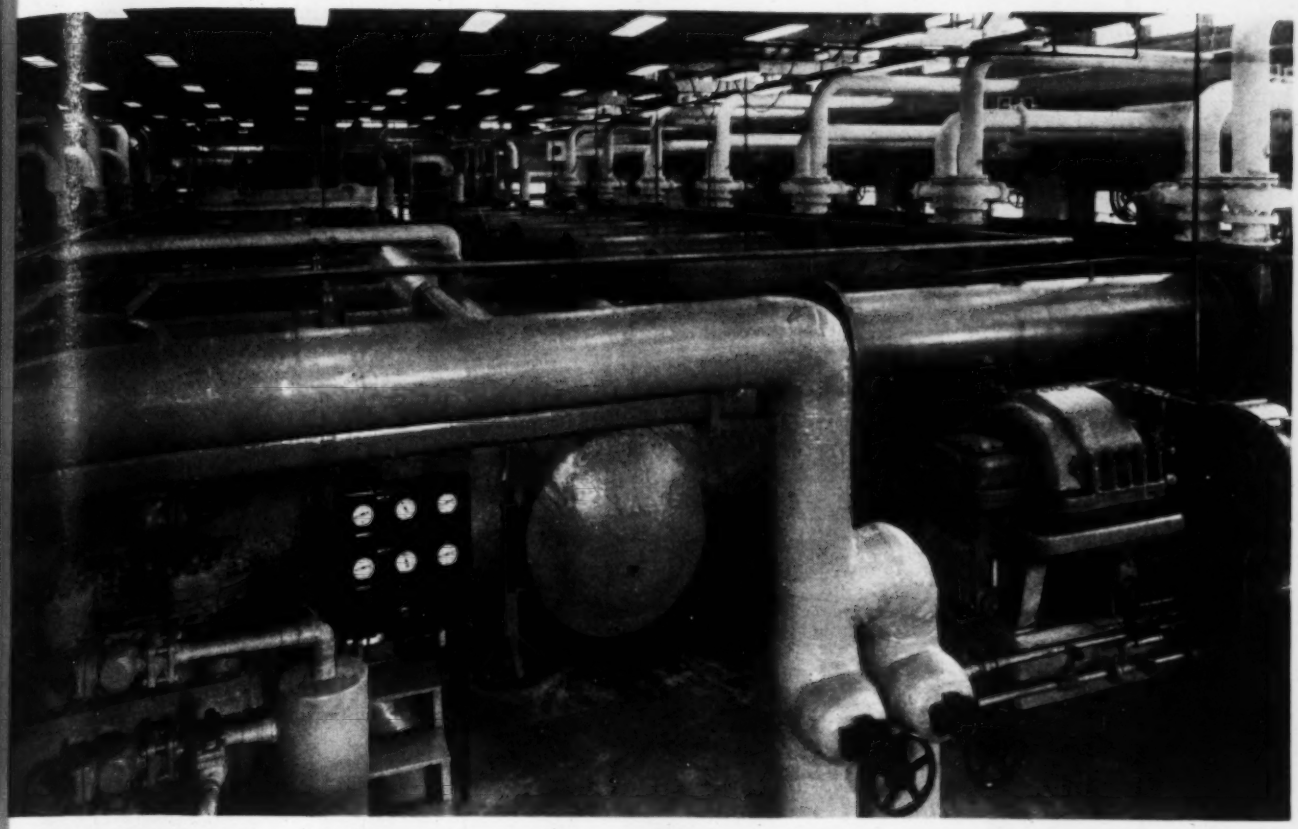
Cleveland Graphite Bronze built a windowless plant just before the war, with centrifugal refrigeration used in the office section and capillary washer evaporative cooling in the plant proper.

Ben Venue Laboratories in Bedford have a very tricky air conditioning system for growing bacitracin. This plant was originally built for growing penicillin and was one of the first in production in February 1944 using the flask system. Bacitracin is a new product similar to penicillin in its culture but it is used on penicillin-resistant cases. Strong-Cobb & Co. has recently installed a number of conditioning systems for handling pharmaceutical products. They have lithium chloride dehumidifiers, "F-12" refrigeration, electronic air cleaning, and special air systems. To those interested in the more complicated systems used in biochemical work these installations are of special interest.

Most of the installations mentioned were handled by a member of the Air Conditioning Association, which organization will have a booth (No. 508) at the exposition. Anyone interested in further details, or who would like assistance in visiting any of these jobs, might well inquire at this booth.



Strong-Cobb & Co. has recently installed a number of conditioning systems for handling pharmaceutical products. Shown here is a supply air duct.



Big Process Refrigeration Installation Used in Research on Aircraft Engines

Efficient Insulation Cuts Losses at NACA Laboratory at Cleveland

WHERE PRECISION control of industrial or laboratory processes or apparatus is encountered, as in the NACA aircraft engine research laboratory at Cleveland, the design and installation of economically correct quantities of insulation directly affect the operating efficiency as well as the costs of operation of the laboratory.

In this great laboratory, one of three government research centers of the National Advisory Committee for Aeronautics, it is necessary to reproduce any climatic condition that may be encountered in flight whenever a research problem requires such conditions. Air temperatures, velocities, pressures, and humidities typical of any condition an aircraft engine will have to meet must be provided regardless of outside weather conditions.

Temperatures from 48 below zero to 130 or more above must be available. Wind velocities up to 500 mph and pressures identical to those encountered up to an altitude of 50,000

ABOVE

This view inside the refrigeration building shows the centrifugal machines used to keep the altitude wind tunnel at low temperatures corresponding to those at high altitudes. Suction lines insulated with cork, expansion joints with hair felt

AT RIGHT

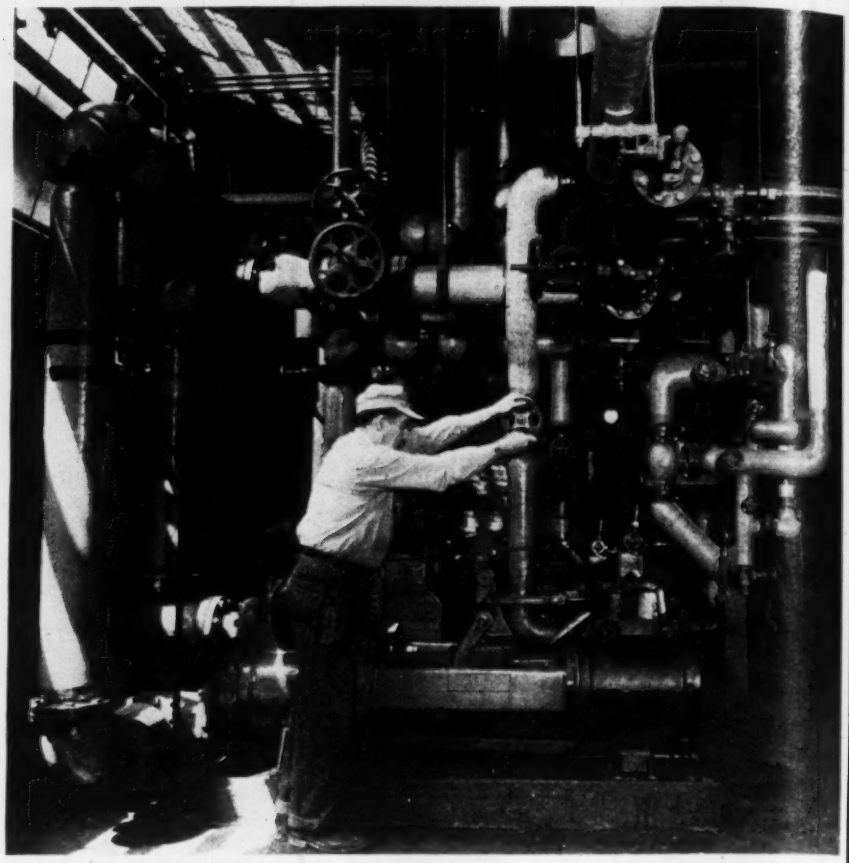
Scale model of the aircraft engine research laboratory of the National Advisory Committee for Aeronautics

AT RIGHT

Boiler feedwater pumps in the heating plant at the aircraft engine research laboratory. The high pressure steam lines shown here are insulated with 85 per cent magnesia and the hot water lines with asbestos-paper-lined wool felt

BELOW

These steam lines, insulated with 85 per cent magnesia, carry steam at 100 psi



ft must also be duplicated. In the icing research tunnel, the flight characteristics of engines, propellers, and aircraft components under a wide variety of conditions at speeds up to 400 mph can be determined.

The precision control of air temperatures is vital to the success of research projects. Air temperatures are controlled by cooling or heating the volumes of air required for the particular project under consideration. To cool the air for the low temperature requirements of the laboratory, the "world's largest low temperature refrigeration plant" is installed. The air heating requirements, the heating of the 15 large and several smaller buildings on the 200 acre site bordering the Cleveland municipal airport, and process steam for other experimental work is provided by three boilers totaling 1420 hp.

Long Lines

The steam generation equipment and the refrigerating equipment are necessarily at considerable distance from many of the buildings, resulting in long steam and refrigeration transmission lines. To reduce to a minimum the losses that occur due to radiation, convection, and conduction the installation of economical thicknesses of efficient insulation was necessary.

What Amount of Heat for Two Dry Kilns?

THE EDITOR—Answering the question dealing with drying apparatus for wet baskets on page 102 in September, there is no point in experimenting with a going installation which already has well placed banks of steam coils for satisfactory heat distribution. "H. W." should think in terms of installing a separate steam generator for supplying these coils the same as they are now supplied from the main plant. Thus it remains only for him to determine the required capacity of such a plant.

To find out how much steam these coils need is possible through a practical test which is not subject to the errors and doubt probable with regard to calculations. Simply disconnect the steam coils from whatever receives the condensate from them and measure the condensate, after the heating-up period, during an hour's peak load operation of the kiln.

If there are no traps, install the proper type, one for each individual coil and all discharging into a container. In case of high pressure steam, the flash steam from the traps also must be suitably condensed.

The result should be so many pounds of water condensed during one hour. Any heating engineer can pick up from there on and accurately determine plant requirements from burner to stack. There should be absolute assurance that, during the test, no coil was shut off or airbound. Also a pressure gage, installed into the main steam supply connection should attest to the fact that a constant required pressure was maintained. If high pressure steam was then used, the auxiliary new plant also should be of that pressure.

—W. O.

Heating, Piping & Air Conditioning

AMERICAN SOCIETY of HEATING and VENTILATING ENGINEERS

Journal Section

The Effects of Moisture Content on the Diffusion of Odors in the Air

By Richard L. Kuehner,* Ph.D., York, Pa.

SUMMARY—Results of investigations of the factors involved in the diffusion of odors are presented in this paper. The effects of varied relative humidities upon the rate of spread of odors are recorded and conclusions are drawn concerning the control of odors by the control of humidity. Other factors involved in the dissemination of odors throughout air conditioned spaces are discussed.

Evidence is produced for recommending the use of synthetic odors in practical odor research but the shortcomings of theoretical conclusions on such a basis are indicated.

Purpose

INVESTIGATIONS have been made on the effects of humidity on odor transmission with the ultimate objective of controlling odors in air conditioned spaces and it is the author's purpose to set forth the findings in this paper. The marked vagueness on the subject of odors ranging from the very definition of an odorous substance up to and including the physiological responses accompanying smell, indicates the complexity of the entire problem.

Introduction

Because considerable difficulty was foreseen in experimentation with natural odors, both in the control of purity and in the measurement of concentrations, the studies were planned around certain synthetic or unnatural odors. To establish the validity of these investigations it was first necessary to be assured that the test compounds lived up to the requirements of the naturally occuring odors.

The generally accepted conception on the subject is that odors are widely dispersed molecules of specific chemical substances, or, in other words, that odors, if they can be concentrated into a recognizable mass, are well defined compounds. The intangibility of odors results only from their dilute dispersion. This definition is, of course, not complete in itself since all substances have the capacity of volatilizing and suspending themselves in air to a certain extent, whereas relatively few possess the property of aroma. Hence, in recent years certain conditions have been added to the original definition. Grey, 1942 (1)[1] pointed out that the animal reception of odors involves a solution process; odors to be registered as such must be dissolved in the secretions bathing the olfactory areas on the nasal conchae. These secretions are lymph-like substances containing a solution of mucus, metallic salts and blood protein which render them more or less of a lipide or fat solvent. Accordingly, Dyson, 1938 (2), demonstrated that all odors must be fat-soluble to a certain extent. This does not mean that they may not have water soluble characteristics but only that they must be sufficiently fat soluble to dissolve in the olfactory secretions up to such a concentration as to elicit the physiological responses of smell. Secondly, Dyson (2) has stated that odors must possess an appreciable vapor pressure.

With these two criteria as a basis it has been shown that odors must possess certain elemental components or molecular arrangements. Niccolini (3, 4) demonstrated that there are two major groups of elements, the olfactory positive group which consists of those elements that may form a part of at least one odorous compound and the olfactory negative group comprising those elements which never form a part of an odorous molecule and therefore possess the power of suppressing the organileptic properties even if combined with odorous elements.

Further work, Dyson 1929 (5), indicated that certain radicals or

*Bacteriologist, Research Dept., York Corp.

For presentation at the 53rd Annual Meeting of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, Cleveland, Ohio, January, 1947

[1]Numerals in parentheses refer to Bibliography.

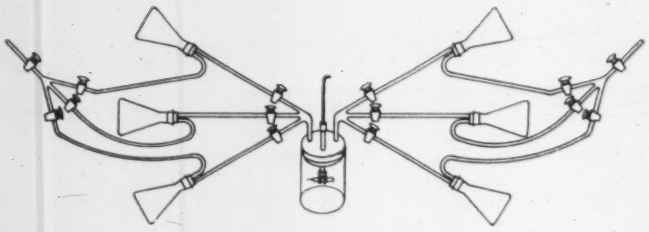


Fig. 1—First design of odor diffusion apparatus

atomic groupings are the seat of olfactory activity in substances. Vanillal, citral, rhodinal, and benzeldehyde all contain the –CHO group; a pleasant odor. The ester group in methylsalicylate, the ether group in safrol, and the ketone group in methylheptenon are all probably the seat of their respective odors.

Stoll 1936 (6), Salomon and Meyer 1937 (7), Hornbastel 1931 (8), and Rodger and Dvolaitskaya 1937 (9) have shown that these radicals and many others are responsible for the basic characteristics of certain odors but that type odor can be changed or modified within certain limits by the placement of prime radicals within molecules and by the varied positions of other secondary odorous molecular radicals.

Because of the large number of possible basic molecular linkages, which can be modified by their surrounding linkages, there has been no comprehensive chemical classification of odors. Odor classification thus far has been based upon the odor characteristic itself. (It is commonly agreed that two individuals will register almost identically the quality if not the intensity of a given odor). The most complete classification found was adopted from the Dutch Physiologist, Linnaeus by Zwaardemaker, (Karrer, 10). Odors here have been divided into 10 different types, on the basis of their aroma. Although no attempt was made to describe modifications of basic odors, this work covers the major categories of natural and unnatural odors. As the author's work did not call for a more finite characterization, Zwaardemaker's types have been accepted. Keath (11), Bienfang (12), and Cramer (13) have agreed with the author's conclusions.

Since odors are normal molecules exerting appreciable vapor pressures, they must have the capacity of mixing with air by means of diffusion. The rapidity with which an odor can permeate the atmosphere in a room with a minimum of convection currents indicates that diffusion as well as convection current is a major factor in the dissemination of odors. In a great many instances diffusion is the apparent prime factor since a constant source of odor imparts to the surrounding air an olfactory threshold to a distance varying with the activity of diluting convection currents. To prevent an odorous area from contaminating a non-odorous area in practical work, as in the case of restaurant kitchens and dining rooms, it is common knowledge that certain minimum velocities of air must be maintained from the odorless area toward the odorous area, dependent upon the intensity and nature of the polluting odor.

Accordingly, since diffusion is a major factor, can this be controlled in any way by which the spread of odorous materials in air streams could be controlled? Woedemann 1935 (14) claimed that odor is much stronger in dry air than where the air is relatively more humid; Rosenau in 1940 (15) claimed the reverse by stating that odors were much stronger in moist air than in dry. The author's prime objective then was to attempt to test these two conflicting statements on the possibility that by controlling humidity odor spread could thereby be controlled.

Experimental Apparatus

Because odor diffusion appeared more easily measurable than convective distribution of odor, the author's experiments were established around this phenomenon. Quite simply it was planned to inject measured quantities of various odors into a vapor tight air space of controlled temperature and humidity. The presence or absence of the odor could then be determined at certain fixed distances from the source of injection at various time intervals. The differences in times required for the various odors to cover these distances under varied conditions of temperature and humidity would then be recorded and compared, the human sense of smell being used as the odor measurement.

In the first attempts diffusion apparatus No. 1 was constructed as shown in Fig. 1. This was simply a central 125 ml beaker serving as the odor reservoir. On the stoppered end of this were placed two glass manifolds each being connected by rubber tubing of ¼ in. ID to three 125 ml Erlenmeyer flasks of equal distance from the central reservoir. The odor was released in the reservoir and at varying time intervals each flask was tested by sense of smell in succession for the presence of the odor. However, reproducible results could not be obtained and in many instances the odors failed to migrate in periods as long as 15 hr.

Diffusion apparatus No. 2 was then designed and constructed as indicated in Fig. 2. This was a Pyrex glass tube of 4 ft 7½ in. over-all length (conveniently flanged for cleaning) having an internal diameter of 3 in. At one end were located three tubes which could be closed by stopcocks. Original air and make-up air were admitted through a tube across the internal discharge end of which was placed a glass flange for preventing the jet injection of air, thereby minimizing the possibility of convection currents. The apparatus was evacuated through stopcock B; a manometer was attached to tube C for giving continuous readings on the pressure in the system. At the opposite end of the

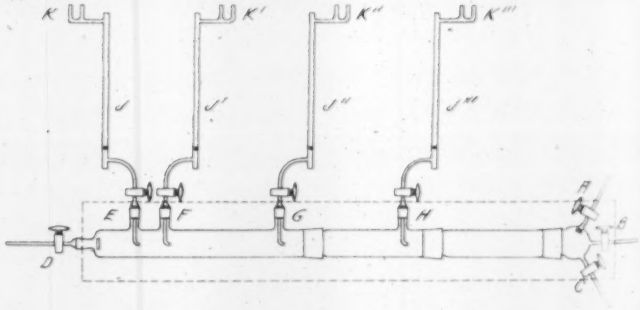


Fig. 2—Diffusion apparatus used in tests

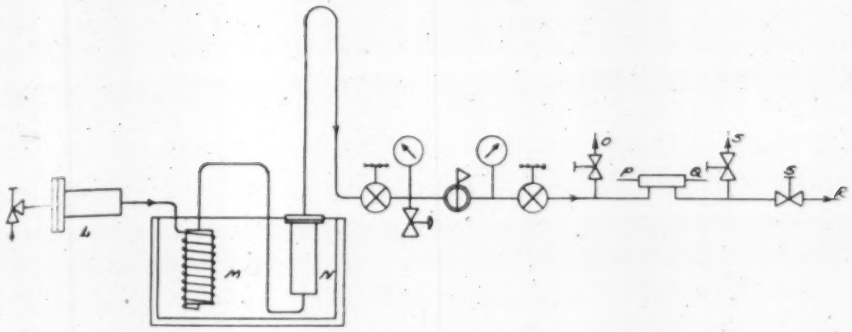


Fig. 3—Air purification apparatus

apparatus was placed a single tube D for the injection of odors.

Distributed at distances of 3, 6, 18, and 30 in. from the odor injection point were placed four sampling connections (E, F, G, and H). These comprised simple glass tubes of ⅜ in. ID projecting into the true center of the diffusion vessel. At this point the tubes were bent at right angles and extended for a distance of ½ in. so that the internal sampling orifice would be in the same plane as the movement of the odor. These connections were equipped with stopcocks and rotameters J, J′ and J″ on the ends of which were fixed nosepieces K, K′ and K″.

This entire apparatus excluding the open end of the odor injection tube and the four sampling connections was immersed into a water bath for controlling temperatures (dotted lines in Fig. 2).

To standardize the conditions it was found necessary to develop a technique for purifying the experimental air. The apparatus involved is shown in Fig. 3. Air at 300 lb pressure was brought in through a Mandler bacteriological filter L, a packed wool filter M, and an activated carbon cylinder N, the latter two being surrounded with solidified carbon dioxide. The air was then passed through tube O to the diffusion apparatus No. 2. Humidity was determined by discharging part of the air over dry bulb thermometer P and wet bulb thermometer Q to the atmosphere R. A constant pressure could be held in tube O by the regulation of the valve on the discharge orifice S.

For the high relative humidity experiments this purified air was humidified by the apparatus shown in Fig. 4. The air from tube O on Fig. 3 was supersaturated with steam produced in flask T. The air was then cooled to bath temperature by condenser U, the entrained moisture being removed by the three traps V. The traps were immersed in the water bath containing the diffusion apparatus No. 2 and the condenser was supplied with the same water by pump W.

Experimental Procedure

The experimental odors were chosen in accordance with the foregoing criteria. In the preliminary screening the compounds must conform to Dyson's and Niccolini's stipulations. At this point, position in Zwaardemaker's classification was taken into account in an attempt to cover odor classes rather than individuals. The final selection was made on the basis of occurrence in the air conditioning industry. With this procedure five odors given in Table 1 were then decided upon.

It must be pointed out that each of the general odor types listed in Table 1, especially body and tobacco smoke odors, is an aromatic aggregate (the author has found 7 in the former and 28 in the latter to date). Therefore, each of the specific compounds listed is not claimed to be the one responsible in each aggregate, but rather, a major component responsible for only a part of the overall effect of the aggregate.

It was understood that before an experimental procedure could be worked out there were certain critical points in apparatus and technique which might very well add variables to the interpretation of results.

From the beginning the reliability of the human nose for a measurement means was a critical point in this work. However, it was found that the nose did not decrease appreciably in sensitivity upon repeated smelling if the odor was smelled only at threshold or slightly above. If a very high concentration of odor were smelled, the olfactory mechanism was temporarily paralyzed toward that specific odor and did not return to 100 per cent efficiency for some considerable time thereafter. If the smelling were only at threshold, E. C. Crocker's findings (15) were confirmed that the nose would return to approximately 100 per cent efficiency after the passage of about 5 sec time. This was not true, however, with irritating type odors since it was found that even threshold samples of irritant odors depressed the efficiency of the nose to any odor for a period of several hours. Since this experimentation was designed for work only at threshold and no irritants were included the nose was considered to be sufficiently reliable for this purpose if all samples were identical in quantity, pressure and velocity. Subsequent experimentation has borne this out.

In getting better control of quantity and velocity of samples a constant internal pressure superseded respiratory suction as the motive force behind the sample. To obtain a satisfactory sample, the odor-air mixture from the diffusion chamber must be forced through the rotameter

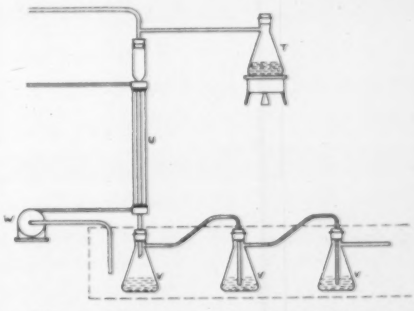


Fig. 4—Apparatus for humidifying purified air

Table 1—Classification of Odors

Odor	Zwaardemaker's Classification	Natural Occurrence
1. Acetic acid	Etheral Type I	human body odor
2. Methyl acetate	Aromatic Type II	decomposition of fruits and flowers
3. Iso-valeric acid	Rancid Type VIII	animal sweat and burning tobacco
4. Butyric acid	Rancid Type VIII	dairy products
5. Pyridine	Narcotic Type IX	protein decomposition and tobacco odor

at the sample connection at the rate of 4 liters per min for a period of 3 sec. This gave the required 25 ml to replace the residual air from the previous samples in the rotameter system and an additional 175 ml of sample for smelling. To obtain this velocity-quantity it was necessary to hold the overall pressure within the apparatus at not less than 4 in. of water. Respiratory exhaustion of a sample from the diffusive vessel at atmospheric pressure could not be satisfactorily controlled for duplicating experiments.

To be assured that results of diffusion at elevated pressures were comparable with those at normal atmospheric pressures duplicating odor diffusion experiments were run on acetic acid at 4, 6, and 10 in. of water pressure and a final one at atmospheric pressure using respiratory exhaustion for the sample. In all cases the results were identical.

Another critical point was that of the injection of odor. The technique was simply that of injecting into the system by capillary pipette that quantity of liquid odor which would be vaporized instantly. It was found that 0.009 ml of isovaleric acid, the least volatile of the five odors, would instantly flash to gas when injected at 60 F. This quantity was used for each of the odors in this experimentation. However, in some instances precise control of this quantity was impossible. To determine the effect of variable injection quantities duplicating experiments were run with isovaleric acid and acetic acid. In the first series 0.009 ml of odor was injected and in the second 0.0045 ml was injected. In both cases it was found that a marked change in the quantity of odor did not appreciably affect the speeds of diffusion. It was, therefore, concluded that slight differences in quantity of injection would have no effect upon the rates of diffusion.

After thorough washing, drying and assembling, the apparatus was sterilized and deodorized by blowing out with steam at 5 lb pressure for 10 min. The system was then evacuated to 100 microns of mercury, filled with dry air and re-evacuated to 100 microns. It was then refilled with the type of air with which the experiment was to be run whether humidified or dry air. With our purifying apparatus we found that we could clear the air of all odors and of all suspended materials of 1/10 micron size and below. The air was likewise dried to 0.2002×10^{-5} grains of moisture per pound of dry air. This will later be referred to as 0 per cent relative humidity. In the humidification system in this experiment air was considered to approximate saturation or a relative humidity of almost 100 per cent. After a 15 min washing period with this air the relative humidity was checked with the dew point apparatus. The contents of the system were allowed to rest for a period of 15 min. at atmospheric pressure while the temperature was being adjusted. The odor was then injected and the pressure immediately adjusted to 4 in. of water.

A pilot run was made in which the operator smelled first sample connection E every 15 sec until the appearance of the odor. He then moved to sample connection F to determine the presence or absence of odor at this point. The operator then advanced to connections G and H, Fig 2, regulating the sampling intervals according to the time involved for the passage of odor between the two immediately preceding sample connections. It was a rule that the odor must be recognizable as a specific entity before it was recorded as positive. Two duplicating runs were considered as a reliable result and were recorded as such.

After the completion of a run, the apparatus was re-steamed and the preparations repeated as described previously.

Table 2—Times of Odor Diffusion at 0 Per Cent R.H.

Odor	Per Cent R.H	Sample Connection	60 F		110	
			Min	Sec	Min	Sec
Pyridine	0	E (3 in.)	0	53	0	20
		F (6 in.)	2	45	0	37
		G (18 in.)	9	30	2	30
		H (30 in.)	23	30	8	0
Isovaleric Acid	0	E	1	45	1	0
		F	4	45	3	45
		G	43	0	15	30
		H	..	..	31	0
Acetic Acid	0	E	0	40	0	23
		F	1	36	0	52
		G	6	45	3	0
		H	..	..	12	0
Butyric Acid	0	E	2	24	0	15
		F	8	0	1	54
		G	31	0	9	0
		H	..	..	..	..
Methyl Acetate	0	E	0	10	0	..
		F	0	21	0	15
		G	1	18	0	44
		H	..	..	..	..

Experimental Results

These results on the diffusiveness of odors have been tabulated at 0 per cent and 100 per cent relative humidity in Tables 2 and 3 respectively. They were prepared by selecting and averaging two or three results of reproducible runs on each of the odors under the conditions studied. For

Table 3—Times of Odor Diffusion at 100 Per Cent R.H.

Odor	Per Cent R.H.	Sample Connection	60 F		110 F	
			Min	Sec	Min	Sec
Pyridine	100	E (3 in.)	0	14	0	13
		F (6 in.)	0	45	0	22
		G (18 in.)	5	0	1	45
		H (30 in.)	16	15	..	..
Isovaleric Acid	100	E	0	52	0	45
		F	3	15	2	15
		G	28	30	11	45
		H	..	..	..	..
Acetic Acid	100	E	0	30	0	10
		F	1	36	32	0
		G	9	15	3	0
		H	18	30	..	..
Butyric Acid	100	E	6	15	1	24
		F	19	0	4	55
		G	59	30	14	15
		H	90	0	..	..
Methyl Acetate	100	E	0	10	0	11
		F	0	20	0	23
		G	1	45	0	42
		H	4	45	..	..

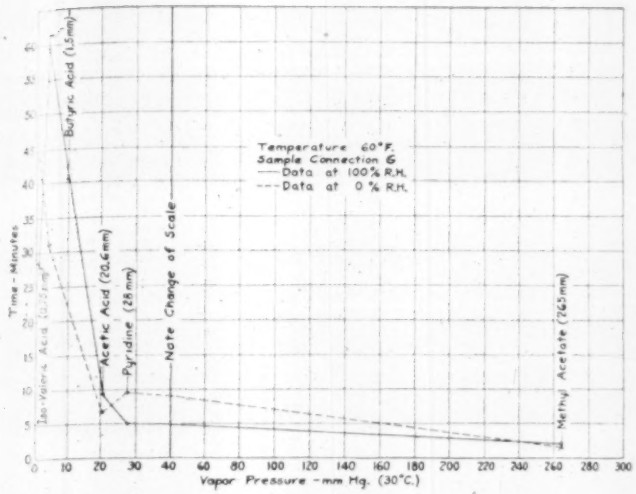


Fig. 5—Relation of rate of odor diffusion, at 60 F air temperature to vapor pressure of substance

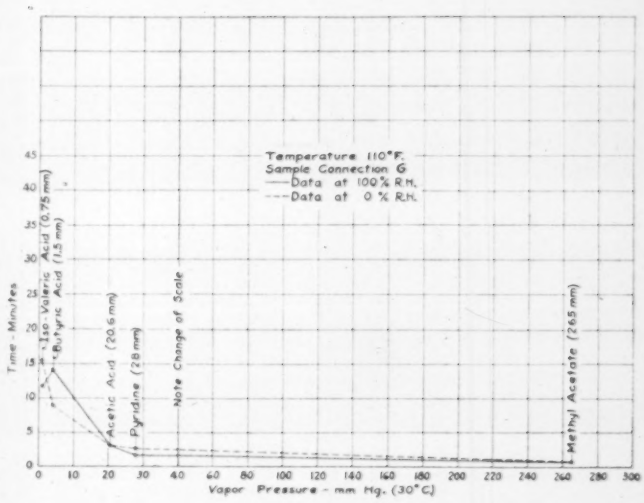


Fig. 6—Relation of rate of odor diffusion, at 110 F air temperature, to vapor pressure of substance

runs to be termed as reproducible the time of the detection of the odor at each of the four sample connections must not vary from the time of former runs by more than ± 10 sec. This has been considered well within the experimental error of the human nose.

Readings taken at point G, Fig. 2, were most reliable and, therefore, were used in plotting Figs. 5 and 6, which show results for the two air temperatures 60 F and 110 F, respectively, and for 0 and 100 per cent relative humidity in both cases.

Using the one dimensional diffusion equation the validity of the experiments has been checked as to their being a true diffusive phenomenon. Solving this equation it has been found that a plot of the log of the time of travel against the square of the distance over time of travel should be linear and produce a curve sloping downward toward the right. In plotting these data with such axes it has been found that the curves shown sloped upward toward the right. However, to swing the lower end of any of the lines into theoretically proper position would require such a small increment of time (15 sec in most cases) that the results have been considered to be specifically diffusive. Although this shows that the diffusion of the odors given under actual conditions is slower than theory would indicate, it can be readily accounted for by the added friction involved.

It will be noted in both Figs. 5 and 6 and in Tables 2 and 3 that the diffusion rates of odors vary in the main according to the vapor pressure gradient. Hence the rate of speed of a given odor varies with its absolute vapor pressure. This is indicated by the general downward swing of the lines on both graphs in Figs. 5 and 6 from left to right. Similarly, the higher the temperature and the higher the concentration of the odorous vapor, the greater the speed of diffusion.

It is appreciated that these findings are at variance with the results of the preliminary experiments on the injection of odor in which it was found that reduction of the initial odor charge by one half showed no effect on the rate of diffusion. However, it would appear that in the former case the author's experiments were well above that critical point at which a change in concentration would result in a comparable change in the rate of diffusion.

The results in this paper indicate also that relative humidity plays some minor role in the diffusivity of the test compounds. Tables 2 and 3 show a general difference in the various comparable points between 0 per cent and 100 per cent relative humidity, these differences being more marked at 60 F than at 100 F. It will be noted that in the case of pyridine and also isovaleric acid the presence of a high relative humidity in the testing air menstrum seems to increase the rate of diffusivity of these two compounds. Here again the difference is greater at the low temperature of 60 F. However, in the case of the other three, acetic acid, butyric acid, methyl acetate, the presence of a high relative humidity seems to depress the velocity of diffusion, the odor traveling faster under conditions of 0 per cent relative humidity. In the case of acetic acid the odor travels from the first two sample connections at a greater rate under 0 per cent relative humidity and then slows up at the third orifice.

It was originally thought that any differences in speed resulting from change in only one variable, relative humidity, might be accounted for on the basis of the solubility of the various odors. It will be noted however, that in the one group, acetic acid and butyric acid are soluble in all proportions in water while methyl acetate is only soluble to the extent of 31.9 g (grams) per 100 ml of water at 20 C. In the other group, pyridine is soluble in all proportions of water while isovaleric acid is only soluble to the extent of 4.2 g per 100 ml of water at 20 C. Therefore, solubility alone does not appear to be directly responsible for differences in the effect of relative humidity upon the diffusion of odors.

In general then, the basic vapor pressure gradient of the various substances under experiment is indicated as the major fundamental force governing the speed of odor diffusion. As anticipated the speeds are markedly changed by any alteration in temperature within a given sample but in relationships between the various other substances, the general slope is still retained as determined by the vapor pressure gradient. This is true whether 100 per cent or 0 per cent relative humidity are employed. It will also be noted that during the experimentation on low vapor pres-

sure compounds the presence of 100 per cent relative humidity seems to have a slowing effect upon the rate of diffusion, whereas, among those of higher vapor pressures the lines reverse themselves in the presence of a higher humidity, and the presence of the higher relative humidity seems to increase slightly the rate of diffusion. However, the reversal in the case of isovaleric acid contradicts this. At any rate, these differences seem to be so slight, especially at the higher temperature of 110 F, that many of the various points could not be defined as being separate and distinct within the limits of the accuracy of the author's technique.

Conclusions

It has been shown that the spread of odors, and thereby the intensity of odors in air conditioning systems, cannot be controlled with any degree of success by the simple control of relative humidity.

Although these data indicate that the relative humidity of the atmosphere does exert an effect on the ability of odors to permeate that atmosphere, this is not a predictable effect since three substances diffused more rapidily at 100 per cent relative humidity than at 0 per cent while in the case of the other two, the reverse was true. Accordingly since most odor problems involve odor aggregates, one could not expect a uniformly depressant effect with either high or low relative humidity. Secondly, the differences in rates of diffusion of specific odors at extremes of from almost 0 per cent to almost 100 per cent relative humidity are so small that commercial design relative humidities of from 45 to 55 per cent would have no effect on the odor problem.

Similarly, commercial design temperatures which vary from 75 deg to 85 deg dry bulb in varying only 10 deg can have practically no effect on the odor problem.

It has been concluded further that the rate of odor diffusion is controlled primarily by the vapor pressure gradient of the substance; that within a given odor the absolute speed of transmission of that odor as controlled by the vapor pressure gradient may be varied markedly by the temperature at which the phenomenon takes place. However, this is not a fixed and fast rule since marked variants from this rule have been found. These variations cannot be satisfactorily explained by any of the factors which were considered to play a part in diffusions of this sort. No correlation was found between velocities of diffusion and the known compound characteristics such as water solubility, olfactory thresholds and molecular areas. Accordingly, predictions cannot be made concerning the diffusibility of unknown odors without taking into account certain as yet unknown factors.

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ASA ELECTS NEW PRESIDENT

At the 28th annual meeting of the *American Standards Association* held at the Waldorf-Astoria, New York, November 21-22, 1946, Frederick R. Lack was elected president. Mr. Lack is vice president and a director of the Western Electric Co., New York, in charge of its radio division.

Mr. Lack became vice president and a director of Western Electric in 1942, after a career with the Bell Telephone System, which began as an assembler in 1911.

During the war he was for a time director of the Army and Navy Electronics Production Agency. In the first World War he served in France with the Signal Corps.

Mr. Lack is a director of the Institute of Radio Engineers, the *Radio Manufacturers' Association* and the Smith Winchester Manufacturing Co. He is president of the *Harvard Engineering Society*, and a member of the *American Institute of Electrical Engineers* and of the *American Physical Society*.

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DEHUMIDIFICATION
Methods and Applications

By John Everetts, Jr.,* San Francisco, Calif.

SUMMARY—The author discusses the use of sorbents in static and dynamic applications for preserving material and equipment. Advantages of solid and liquid sorbents are considered. Charts are presented for determining relative costs of sorbents *vs.* refrigeration for dehumidification.

PRIOR to World War II the use of sorbents in the air conditioning industry was purely secondary with the exception of a few isolated and specialized applications.

During the war the use of sorbents for the dehumidification of air received a tremendous impetus for these reasons: (1) The preservation of materiel and (2) the increased number of manufacturing plants requiring humidity control to improve the quality and quantity of their product.

Manufacturers as well as shippers soon recognized the heavy toll that moisture in the atmosphere was taking through corrosion and tarnishing of metals; changes in dielectric properties of radio and electronic equipment; mildew, mold and fungus rot in foods, clothing, leather, and many other materials. A large portion of this damage occurred before the materials were shipped out of the United States. To prevent this damage it was necessary to package the materials in vapor-proof wrappings and to include a small container of sorbent material to assure the preservation of the product. Where the product is stored in bulk, it is done in dehumidified warehouses or storerooms where the humidity is definitely controlled. The Navy in its post war program is now completing the dehumidification of approximately 3000 vessels in the inactive reserve fleet. The Navy is also dehumidifying a number of their large warehouses to preserve the dielectric properties of radio, radar, sonar, and other electronic equipment and spare parts. The Army has taken similar measures to preserve tanks, ordnance equipment, and other valuable material. Today industry, both here and abroad, is recognizing the importance and economic value of dehumidification for preservation as well as its use in manufacturing processes.

There are two general methods for dehumidifying namely *static* and *dynamic*. Static dehumidification is accomplished by merely placing a container of sorbent material inside the package, or the enclosure which is to be treated. The package or enclosure should be reasonably tight to prevent the infiltration of moisture laden air. In some applications it is also necessary to vapor-proof the enclosure to prevent vapor infiltration. The sorbent may be discarded after use or it may be reactivated and used over again, depending upon the type of sorbent used and the application. Most solid sorbents can be reactivated by placing them in an ordinary oven and heating to a temperature of 250-300 F for a few hours. Obviously, it is impossible to control the relative humidity at any one point with static dehumidification. The use of an indicator gel will give a visual approximation of the conditions. If the relative humidity is low, the indicator gel will show a blue color and, as the relative humidity increases, the indicator gel will turn pink. As soon as the indicator starts to show a pink color, it is necessary to replace the sorbent or to reactivate the one in use. The quantity of sorbent material required will vary widely depending upon the product to be preserved and the size and tightness of the space in which the product is located. Silica gel, for example, at a temperature of 80 F will absorb up to 30 per cent of its weight in moisture (2100 grains) when in equilibrium with an atmosphere having a dew point of approximately 60 F or a relative humidity of 50 per cent under these conditions. Conditions of satisfactory dryness have been maintained in empty fuel tanks over long periods of time with as little as one pound of silica gel per 100 cu ft of volume after the initial drying has been completed. There are many applications where static dehumidification is a necessary requirement for the proper preservation of material either in storage or in transit. Each application, of course, requires individual study to determine the most economical and serviceable arrangement. Solid sorbents which do not change their physical characteristics are the only type which can be used for static dehumidification.

Dynamic dehumidification is obtained by circulating air through a sorbent material which is automatically reactivated to maintain continuous operation and hold a predetermined constant humidity condition within the treated space. A schematic flow diagram of a continuous operation, dehumidification unit is shown in Fig. 1. Dynamic dehumidification is used where a definite humidity condition must be maintained and in applications which are too large for the economical use of the static method. The research work which was done during the war for the Navy at the Engineering Experimental Station, Pennsylvania State College, has resulted in the development of machines which are more efficient and serviceable than the pre-war models.

During the war, sorbent materials were improved in quality as the result of greatly increased production and more rigid specifications. In the solid adsorbents silica gel, activated alumina, and activated Bauxites were used for static dehumidification; silica gel and activated alumina in the dynamic dehumidification machines. Among the liquid sorbents lithium chloride of the halogen salts group and glycols were important in dynamic dehumidification.

The advantages of solid or liquid sorbents are dependent upon the requirements of their application and

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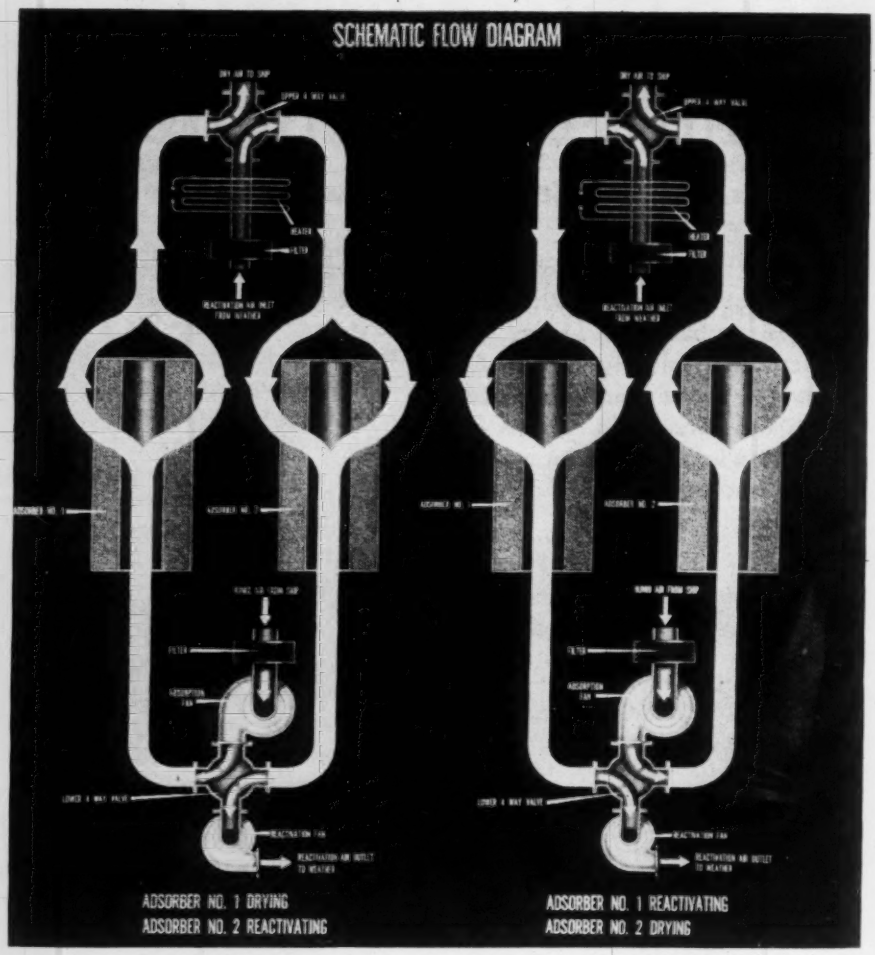


Fig. 1—Schematic flow diagram for continuous operation of dehumidification unit

the economic analysis of the available utilities involved in the operating expense. The dew point depression of a solid sorbent is the function of the *temperature* of the sorbent material whereas for the liquid sorbents the dew point depression is limited by the *density* of the solution (see Fig. 2).

Liquid absorbents are usually in the form of hydrates and as such, the density must be kept above the freezing or crystallization point of the solution. As the temperature is lowered, the operating range is reduced and at the same time the viscosity of the solution is rapidly increased thereby adding to the power consumption in the pumping cycle.

The sorption characteristics of hydrated solutions also vary where there is a change in phase of the sorbent. For example, solid calcium chloride has a greater sorption ability than it has when in the liquid phase.

Solid adsorbents have no phase change characteristics, therefore can be used over a much wider range of conditions.

A system using solid sorbents has certain advantages over one using liquid sorbents:

1. Simplicity of design and operation.
2. No periodic replacement of sorbent material because of loss.
3. Psychrometric conditions are not affected by the inclusion of air borne dust, dirt, and other impurities.
4. No corrosion hazard.
5. Applicable for portable and mobile units.
6. No carry-over of sorbent in air stream that may be deleterious to product being processed.

The advantages of a system using liquid sorbents over that of a system using solid sorbents may be listed as follows:

1. Uniform conditions of temperature and humidity of delivered air.
2. Humidification when required.
3. Removal of mold spore and bacteria from the air passing through the sorbent.

These advantages apply to those sorbents which are at present commercially available for the prime purpose of dehumidifying air. Certain clay and earth-type solid sorbents will break down into fine dust through excessive handling or vibration and will cause the bed to pack to a greater density and thereby increase the resistance to the air flow. Particles of this dust carried into the air stream are objectionable. Corrosion from liquid sorbents may be greatly reduced by the proper treatment of the solution and the selection of the least corrosive types. For example, zinc chloride is one of the best sorbents in the halogen group; however, it is so highly corrosive, particularly in the regeneration cycle, that it is commercially impractical. Carbitol, a glycol derivative, will theoretically give a 90 deg dew point depression from atmospheric conditions but, because of the complicated and expensive method required for regeneration, it, too, becomes impractical at the present time. Calcium chloride has little value in this field. It has low sorption qualities, is highly corrosive, and is difficult to handle. Its low cost is offset largely by the additional quantity required to meet most of the conditions within its limited application.

There has been considerable discussion in recent years as to the relative value of mechanical refrigeration for dehumidification applications. One of the proposed methods is to use a cooling coil to reduce the air conditions to the desired dew point and then a reheat coil with the hot refrigerant gas to raise the air temperature to the desired dry bulb. In effect, this would be an air cooled condenser. If electrical energy is used to regenerate the sorbent as well as operate the mechanical refrigeration equipment then refrigeration is favored over a rather wide range of dehumidification applications. However, if steam is used for regeneration of the sorbent and electric power is most practical for the refrigeration equipment, then dehumidification by sorbents is the most economical. Fig. 3 shows a comparison in operation costs of dehumidifying by sorbents, using steam for regeneration and with supplementary electrically operated mechanical refrigeration where required, versus the use of mechanical refrigeration only. It will be noted that under the conditions given, mechanical refrigeration is more economical than the sorbent method only when the delivered dry bulb is 70 or lower and the entering dew points are above 65 F. All other

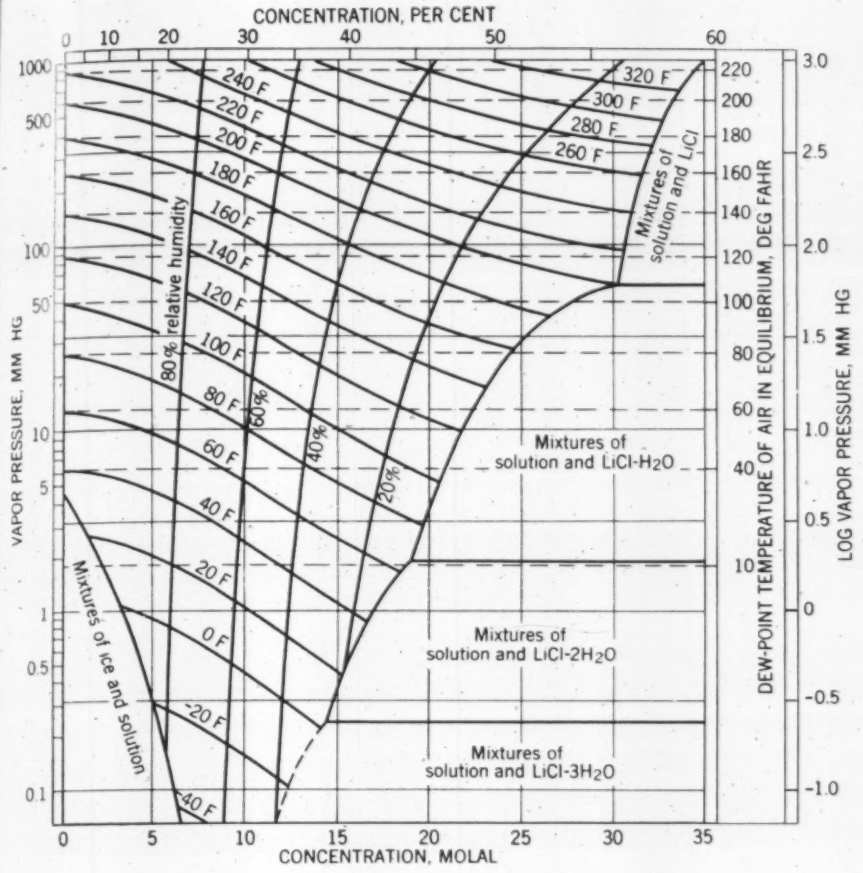

CONCENTRATION, PER CENT
VAPOR PRESSURE, MM HG
DEW-POINT TEMPERATURE OF AIR IN EQUILIBRIUM, DEG FAHR
LOG VAPOR PRESSURE, MM HG
CONCENTRATION, MOLAL
80% relative humidity
Mixtures of solution and LiCl
Mixtures of solution and LiCl-H2O
Mixtures of solution and LiCl-2H2O
Mixtures of solution and LiCl-3H2O
Mixtures of ice and solution

Fig. 2—Temperature-pressure concentrations for lithium chloride

conditions show the sorbent method to be more economical. The greater spread between the delivered dry bulb and delivered dew point favors the sorbent method and affects mechanical refrigeration adversely because in the latter case it is necessary to reduce the suction pressure thus reducing compressor capacity and at the same time increasing the condensing temperature. This increases the power input to the compressor. As the difference between the dry bulb and the dew point is reduced, this accumulative effect is reduced in favor of refrigeration and against sorbents because with sorbents it is necessary to increase the after-cooling requirements to meet the conditions. Fig. 4 shows a direct comparison where electric regeneration is used. As most of the industrial and commercial applications fall within the limits shown in Figs. 3 and 4, the use of mechanical refrigeration is not very promising for dehumidification unless steam is not available for sorbent regeneration. Other charts may be made showing comparisons for power, steam, or gas rates other than the values shown in these charts. The operating cost for sorbents may be further reduced from that shown by using after-cooling at the higher temperatures through the medium of cooling tower water, well water, or partial evaporative cooling.

The data from which the curves in Figs. 3 and 4 were determined were taken from actual tests of dehumidification machines using solid sorbents. Mechanical refrigeration data were taken from performance tables of representative manufacturers of this type of equipment. The values shown will vary slightly with the variations in the many types of cooling coils, condensing units, and the type of solid sorbent used; therefore these curves should be considered as a qualitative rather than a quantitative analysis. Each application will require its own analysis predicated upon utility rates current to the job and upon the characteristics of each type of machine. The values for liquid sorbents will fall within the range shown for the solid sorbents if comparable systems are used. The total load for all sorbents is practically the same except for the minor difference in the heat of absorption which will vary slightly depending upon the type and kind of sorbent material used.

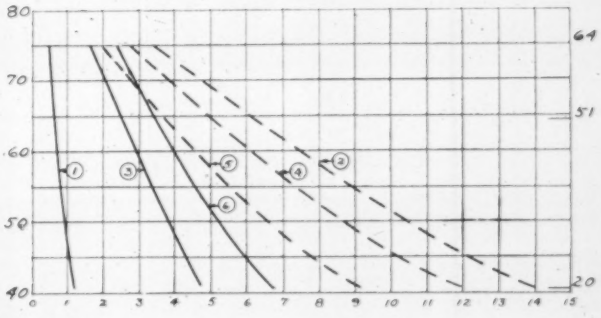
A third method has been proposed, and in a few instances used, to prevent condensation of moisture on materials stored in warehouses. This method employs the use of heat to raise the dry bulb temperature in the space and reduces the relative humidity to the desired level. This is not dehumidification in any sense of the word because moisture has not been removed from the air. There are several objections to this method:

1. On a hot humid day the temperature required in the space is higher than that allowed for employees working in such spaces.

2. This method does not prevent condensation of moisture on windows, beams, or other appurtenances of high conductivity if the outside temperature should suddenly drop below the inside dew point.

3. In many cases the higher temperatures required will have a deleterious effect upon the product stored.

Fig. 3—Operating cost comparison of sorbent *vs.* refrigeration if sorbent is reactivated electrically and after-cooled by refrigeration


ENTERING DEW POINT—F AVERAGE EFFLUENT DEW POINT
COST IN DOLLARS PER THOUSAND LB WATER REMOVED
Conditions
Entering dry bulb—95 F
Refrigeration electrically operated
Electric power 1c. per kwhr
Steam $0.30 per 1000 lb
① Sorbent with 135 F effluent air
② Refrigeration with 135 F effluent air
③ Sorbent with 95 F effluent air
④ Refrigeration with 95 F effluent air
⑤ Sorbent with 70 F effluent air
⑥ Refrigeration with 70 F effluent air

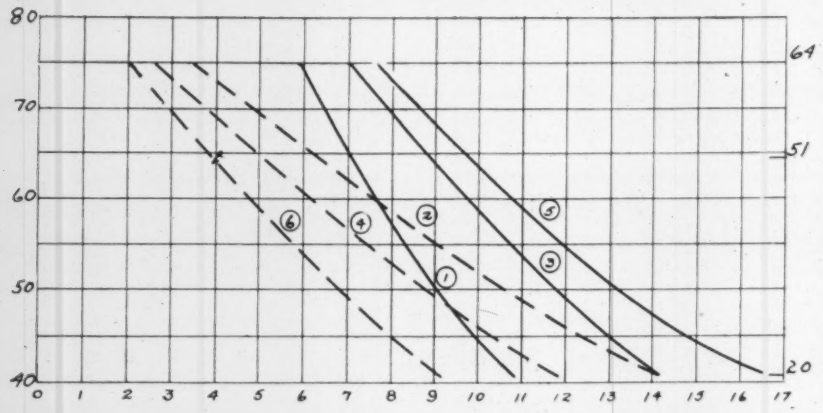


Fig. 4—Operating cost comparison of sorbent *vs.* refrigeration if sorbent is reactivated by steam

ENTERING DEW POINT—F AVERAGE EFFLUENT DEW POINT—F
COST IN DOLLARS PER THOUSAND LB WATER REMOVED

Conditions

Entering dry bulb—95 F
Refrigeration electrically operated
Electric Power—1c. per kwhr

① Sorbent with 135 F effluent air
② Refrigeration with 135 F effluent air
③ Sorbent with 95 F effluent air
④ Refrigeration with 95 F effluent air
⑤ Sorbent with 70 F effluent air
⑥ Refrigeration with 70 F effluent air

4. The operating cost is much greater than the dehumidification to the same relative humidity condition.

Table 1 shows the requirements for a warehouse of standard construction size 100 ft × 40 ft × 15 ft. The steam required for heating is based upon the heat loss through the building plus one air change per hour.

The steam required for dehumidification is based upon the removal of moisture from the outside dew point to that dew point corresponding to the desired relative humidity; the temperature in the warehouse remains the same as the weather. The difference in operating cost between heating and dehumidifying will offset the additional cost of the dehumidifying equipment for this particular installation in less than two years.

The application of dehumidification to industrial and commercial problems is so broad that it is difficult to cover it in the short period of time that this presentation will allow. In general, the applications may be divided into seven groups or classifications for:

1. Prevention of corrosion and tarnishing of metals, precision tools, instruments, photographic apparatus, and allied equipment.
2. Preservation of the dielectric properties of radio and electronics parts, and communication equipment.
3. Prevention of deterioration by dampness and mold of foods and food products.
4. Prevention of damage by moisture to paper, paper products, leather, fur and fur products, textiles, books, and other similar materials.
5. In the production and preservation of chemicals, drugs, pharmaceuticals, and cosmetics.
6. Metallurgical processes.
7. Industrial processing of materials and products.

Dehumidification has become an important part of our industrial and commercial business and will continue to be so long as there is moisture in the atmosphere.

It is well to inject a word of caution at this time. Dehumidification is primarily an engineering subject. No credence should be given to the rule-of-thumb methods now being used to analyze this type of problem. Unless the application is properly engineered, the chances of grief are many.

The development of new sorbent materials and the more efficient use of sorbents is making dehumidification an industry comparable to those of heating, refrigeration and air conditioning.

Table 1—Requirements for a Warehouse of Standard Construction (100 ft x 40 ft x 15 ft)

Weather Conditions			Desired	Required	Steam Required lb Hr	
DB	DP	Per Cent RH	Per Cent RH	DB	Heating	Dehumid.
80	73	80	45	98	356	85
70	64	80	45	88	356	72
60	54	80	45	78	356	57

ASRE RESEARCH PROJECTS ANNOUNCED

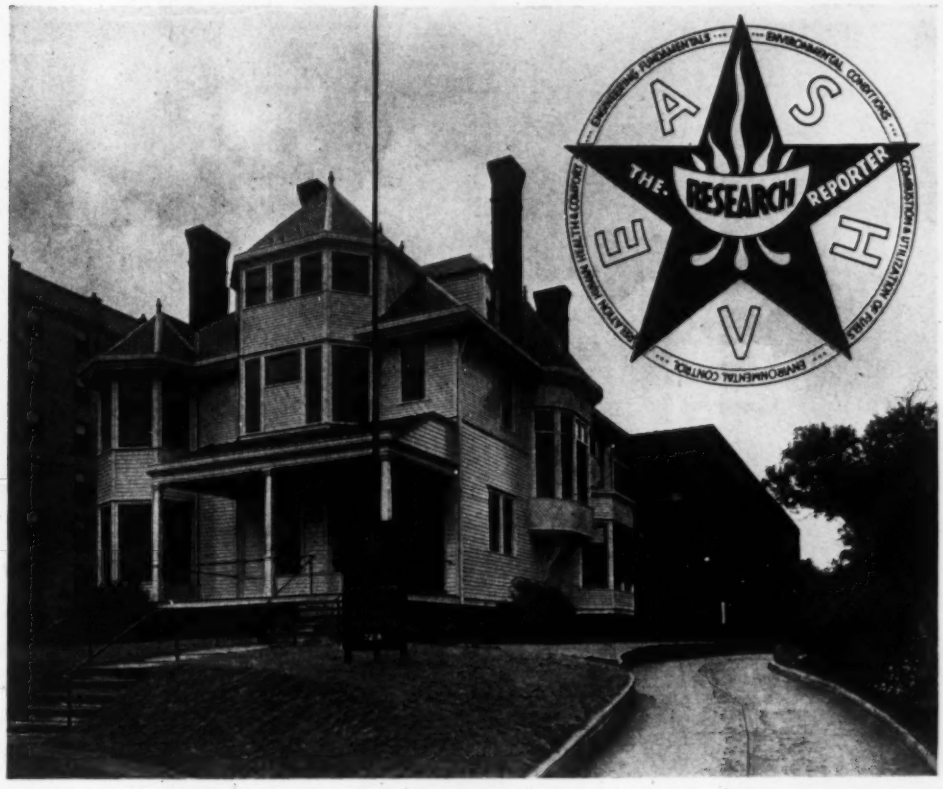
The *American Society of Refrigerating Engineers* has sponsored research in the field of refrigeration in the form of thirteen grants to nine recognized engineering colleges in order to provide the industry with the results of research study and encourage exceptional talent to enter the refrigeration industry.

This activity has been sponsored by the *ASRE* Research Committee, of which Dr. W. R. Hainsworth, vice president, Servel, Inc., is chairman, and Prof. Karl F. Kayan, Columbia University, is vice chairman. Other members of the committee are, G. L. Boone, Dr. H. C. Diehl, Dr. R. B. Mears, G. B. Priester and Prof. J. M. Tucker.

The plan as it now functions, includes the establishment of research fellowships for full time graduate students and *grants in aid* of modest sums to institutions for the support of specific research projects. Only one fellowship has been established to date, that is in the engineering department at Pennsylvania State College, carrying an annual payment of $1200. This department is particularly interested in the study of the effects of moisture on thermal conductivity.

Before final arrangements are made with a college for *grants in aid* the purpose and scope of the investigation is explained and a brief outline of the procedure presented. In the administration of fellowships, the same procedure in general is followed, except that there is no requirement as to any specific title or research subject, but it is understood that the student selected will specialize in the general field of refrigerating engineering on basic topics such as heat transfer, thermodynamics or food technology.

The following are the colleges where grants have been established: Case School of Applied Science, Cleveland Ohio; University of Texas, Austin, Tex.; Massachusetts Institute of Technology, Cambridge, Mass.; Oregon State College, Corvallis, Ore.; Columbia University, New York, N.Y.; University of Florida, Gainesville, Fla.; Northwestern University, Evanston, Ill.; University of Minnesota, Minneapolis, Minn.; and University of North Carolina, Raleigh, N.C.



Alfred J. Offner
President

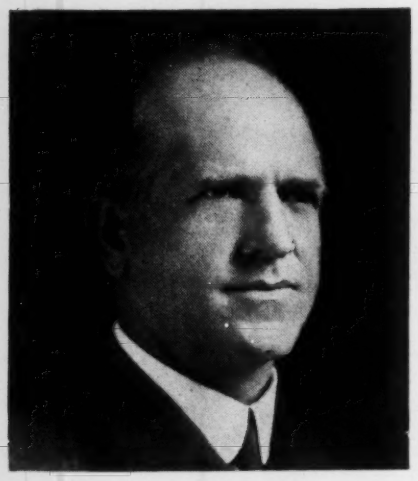
AN INVITATION TO MEMBERS OF ASHVE

L. P. Saunders
Chairman of Committee on Research

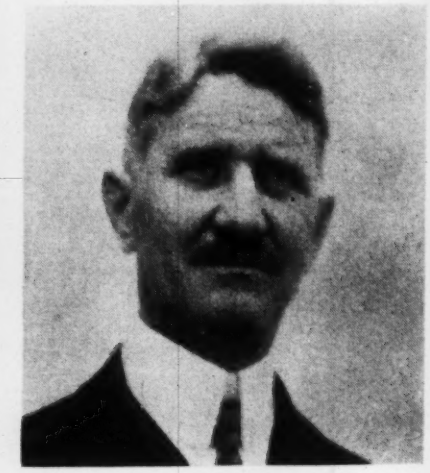
You are cordially invited to visit your Laboratory located at 7218 Euclid Ave., East, Cleveland, Ohio, where Open House will be held during the week of the 53rd Annual Meeting, January 27, 1947. This is your opportunity to meet the Staff and inspect the Laboratory, and to learn at first hand the progress of the projects upon which the Staff is now engaged. The Society is unique in having been helpful to industry and thus to have enhanced the prestige of the Society. The members of the Committee on Research with the Laboratory Staff, will do everything possible to make your visit to the Laboratory a memorable one.

Alfred J. Offner

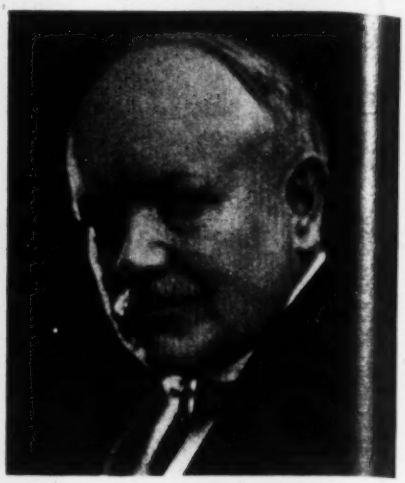
L. P. Saunders



J. R. Allen



L. A. Scipio



F. Paul Anderson

F. C. Houghten

Cyril Tasker

COMMITTEE ON RESEARCH CHAIRMEN 1917-1946

1946	L. P. Saunders
1945-44	G. L. Tuve
1943	C. M. Ashley
1942	F. C. McIntosh
1941-40	A. E. Stacey, Jr.
1939-38	W. L. Fleisher
1937-36	W. A. Danielson
1935	A. P. Kratz
1934	John Howatt
1933-32	G. L. Larson
1931	C. V. Haynes
1930	F. B. Rowley
1929	L. A. Harding
1928-27	S. R. Lewis
1926	H. P. Gant
1925-24	W. H. Driscoll
1923	E. E. McNair
1922	Thornton Lewis
1921	J. R. McColl
1920	F. R. Still
1919-18	J. Irvine Lyle
1917	G. W. Barr and Perry West

HISTORY OF RESEARCH LABORATORY

After several years of discussion and planning the Research Laboratory of the American Society of Heating and Ventilating Engineers was established in 1919 and the prevision of its founders now rests firmly upon a brilliant record of achievement, which has not only contributed notably to the science of heating, ventilating and air conditioning, but which has proved immeasurably profitable to the allied industries and consequently of incalculable benefit to the public.

The history of the Research Laboratory of the Society is illuminated by the devotion of many individual members who gave unstintingly of their time and means and by the whole membership which unanimously and wholeheartedly supported the proposed research program from the very beginning. In the light of the Society's small membership in 1919 the establishment of a laboratory was truly an ambitious undertaking.

The first thoughts of pure research conducted by the Society on a basis of determining the basic or fundamental principles underlying all matters in the science of heating, ventilating and air conditioning and wholly untrammeled by commercialism, were expressed by non-recorded members for many years prior to 1916. It is probable that the description of a foreign Laboratory by the late Arthur K. Ohmes spurred the thought in our own Society and during the presidency of Harry M. Hart in 1916, the idea began to crystallize. In 1918 during the presidency of the late J. Irvine Lyle the project was pushed by the appointment of a committee consisting of George W. Barr, Chairman, H. M. Hart, W. W. Macon, Wm. F. McDonald, J. W. H. Myrick and Perry West, which made an initial survey and rendered a favorable report. Throughout the presidencies of Messrs. Lyle and F. R. Still the whole membership aided enthusiasti-

cally and the support was especially marked by devoted work of Homer Addams, J. R. Allen, F. F. Bahnson, C. A. Booth, Mr. Chaffee, F. K. Chew, J. H. Davis, S. E. Dibble, M. W. Franklin, F. E. Giesecke, H. M. Hart, J. D. Hoffman, C. A. Humphreys, A. S. Kellogg, G. B. Larimer, E. E. McNair, L. W. Moon, E. T. Murphy, C. W. Obert, Arthur Ritter and W. S. Timmis.

On August 1, 1919 during the presidency of Walter S. Timmis, the Research Laboratory was officially established and began to function at the United States Bureau of Mines, Pittsburgh, Pa.

The first Director of the Laboratory was John R. Allen, a brilliant scientist who had served as Dean of Mechanical Engineering, University of Michigan and as Dean of Engineering and Architecture at the University of Minnesota.

After the tragic death of Dean Allen in October 1920, Dean L. A. Scipio of Robert College, Constantinople, served for a year during his leave of absence from the College.

On August 1, 1921 the directorship of the Laboratory was assumed by F. Paul Anderson, Dean of the College of Engineering, University of Kentucky.

In September 1925 Ferry C. Houghten became the Director and served until his entry in the Navy.

On October 1, 1943 Cyril Tasker was appointed Director of Research and took charge of the new laboratory facilities at Cleveland, which were temporarily located at 10700 Euclid Ave. At the end of a two-year lease it was found necessary to look for other quarters and a special committee recommended the purchase of a building at 7218 Euclid Ave., which came into the Society's possession in July 1946.

The official dedication of the Laboratory will be held January 27, 1947 and the members of the Society are justifiably proud that the ASHVE is the only professional engineering organization which maintains and operates its own Research Laboratory. This record of outstanding accomplishment is recorded in the Society's TRANSACTIONS, and in the HEATING, VENTILATING AND AIR CONDITIONING GUIDE.

★ ★ ★

Members of the Staff Who Will Greet Visitors Jan. 27-31, 1947

Clark M. Humphreys
Senior Engineer

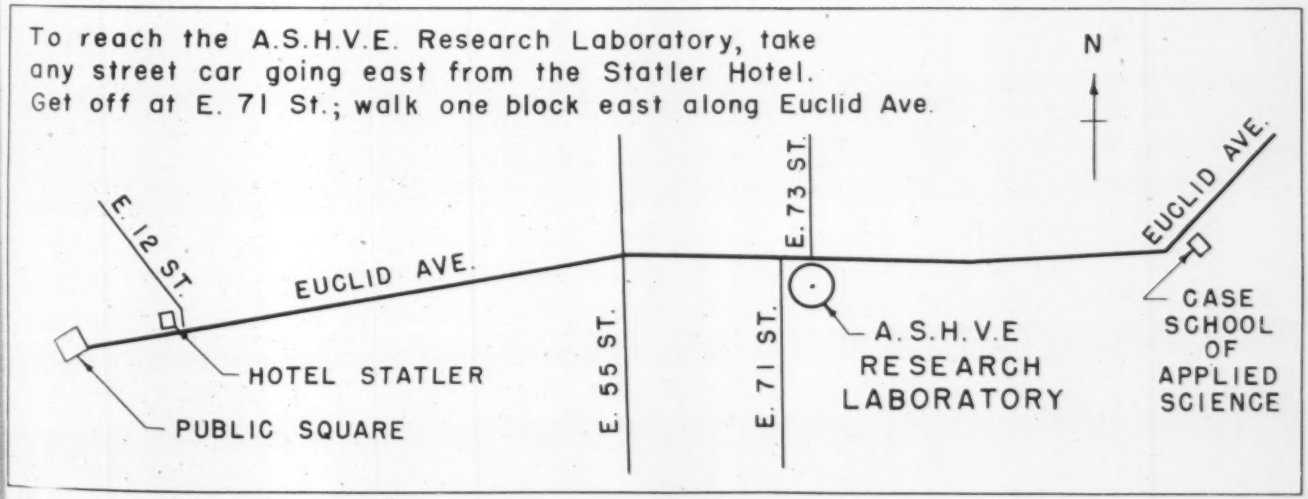
George V. Parmelee
Research Fellow

Richard G. Huebscher
Research Engineer

Herbert B. Nottage
Research Associate

Ilse M. Jahn
Secretary

Doris M. Dietz
Laboratory Assistant


To reach the A.S.H.V.E. Research Laboratory, take any street car going east from the Statler Hotel. Get off at E. 71 St.; walk one block east along Euclid Ave.
N
E. 12 ST.
EUCLID AVE.
E. 73 ST.
EUCLID AVE.
HOTEL STATLER
PUBLIC SQUARE
E. 55 ST.
E. 71 ST.
A.S.H.V.E RESEARCH LABORATORY
CASE SCHOOL OF APPLIED SCIENCE

NOMINEES FOR COMMITTEE ON RESEARCH

Three-Year Term

Robert C. Cross, Chicago, Ill., Sears, Roebuck and Co., in charge of mechanical division, Merchandise Testing and Development Laboratory, was born at Westfield, Mass., and was graduated from Northeastern University with a B.M.E. degree in 1925.

His first association in business was with the H. B. Smith Co., Westfield, Mass., in 1925 where he became design and test engineer in charge of the laboratory conducting boiler evaporation tests, combustion studies

R. C. Cross

and oil burner tests. He held the position until 1929 when he joined the staff of the U. S. Bureau of Mines, Pittsburgh, Pa., as assistant fuel engineer working on flue gas analysis and secondary air devices.

He returned to H. B. Smith Co. the following year as supervising engineer of research, where he remained for five years. He was in charge of all research, including laboratory program and product development. His work covered technical training of sales engineers, as well as cooperating with the advertising and production departments. During the two periods of employment with H. B. Smith he supervised approximately 1200 boiler evaporative tests, utilizing anthracite, bituminous coal, coke and oil. He also conducted approximately 350 field installations of heating boilers.

In 1935 he became fuel engineer at Battelle Memorial Institute, Columbus, Ohio, working on projects including field surveys of domestic heating plants, design, erection, and testing of double grate, underfeed boilers, and design of automatic underfeed stokers for bituminous coal.

In 1940 he joined the staff of The Schwitzer-Cummins Co., Indianapolis, Ind., as chief engineer of the heating division. He planned and established a complete stoker testing laboratory, and redesigned the line of stoker-fired furnace units. Other major efforts included the design of stoker-fired space heaters and the study and development of large anthracite stokers.

In 1941 he became senior combustion engineer in the testing laboratories of Sears, Roebuck and Co. and later that year became head of the mechanical division, which position he now holds.

Mr. Cross has published numerous articles relating to studies of domestic oil burners in technical publications as well as presenting papers at Society meetings. Besides being a member of the Society, which he joined in 1937, he is also a member of the *ASME*. He contributed to revisions in the chapters on automatic fuel burning equipment and fuels and combustion in both the 1938 and 1939 editions of THE GUIDE, and is now serving on the 1947 Guide Publication Committee.

* * *

M. K. Fahnestock, Urbana, Ill., Research Professor and Assistant Director, Engineering Experiment Station, University of Illinois, was born at Wanda, Ill. He received his B.S. in mechanical engineering from the University of Illinois in 1924.

For the first two years after his graduation he was mechanical engineer for the Shell Petroleum Corp., Wood River, Ill., engaged in construction work, both in the office and in the field. In 1926 he joined the research staff of the department of engineering at the University of Illinois, under Profs. A. C. Willard and A. P. Kratz. He was engaged in the heating and air conditioning field. During this time his work involved the development, erection and operation of the refrigerated room, heating and testing plant in the mechanical engineering laboratory at the University, as well as the warm wall test booth for providing an economical method of testing and rating concealed gravity type convectors. The former room is adaptable to the testing of all types of space heating units, insulations, radiator furniture and finishes, weather strips, storm sash, wall construction, controls, etc., under actual service conditions. The

M. K. Fahnestock

latter room is the type of booth adopted as a standard by the ASHVE.

Professor Fahnestock took an active part in the residence cooling investigations carried on at the research residence at the University. His work also involved the construction and operation of an eupatheoscope, an instrument designed for measuring the equivalent temperature of an uniform environment in terms of a uniform environment.

He has written numerous papers which were presented before Society meetings and published in the TRANSACTIONS of the Society as well as various articles in the Engineering Experiment Station at the University.

Professor Fahnestock has been a member of the Society for over fifteen years and during these years has taken an active interest in Society affairs. He served as a member of the Committee on Research from 1938-1943, and as a member of its Executive Committee in 1942-43. Professor Fahnestock has served as chairman of the Technical Advisory

Committees on Refrigeration in Relation to Air Treatment, and Direct and Indirect Radiation with Gravity Air Circulation in 1935 and 1936, respectively, and as a member of the Technical Advisory Committee on Effect of Entering Temperature and Velocity on Temperature and Distribution of Air Within an Enclosure in 1936. He also served for a period of seven years as chairman of the Technical Advisory Committees on Radiation with Gravity Circulation and on Summer Air Conditioning for Residences. He is also a member of the *ASME*.

In 1943, when he was appointed Research Professor and Assistant Director of the Engineering Experiment Station, provision was made for Professor Fahnestock to maintain his contacts in the heating, ventilating and air conditioning fields, both in the physical and biological sciences. He also continued to coordinate the research work in the University's colleges in Chicago and Urbana which related to the effect of atmospheric environment on human beings. He is also interested and engaged in helping in the development of the University's program of education and research in air transportation.

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John James, Cleveland, Ohio, former Technical Secretary for the ASHVE, was born at Brookville, Ind. He attended the Benson Polytechnic School, Portland, Ore.; was graduated from Oregon State College with a B.S. degree in mechanical engineering in 1928; and received his M.S. in mechanical engineering from the University of Wisconsin, Madison, Wis., in 1934.

During vacation periods while attending Oregon State he was employed by G. E. Reed, prominent consulting engineer in whose office he remained until January 1932. His work consisted of the preparation of the mechanical plans and specifications for public and private buildings. He was placed in complete charge of the design of such buildings as hotels, theaters, apartment buildings, residences, courthouses, restaurant buildings, etc.

When Mr. Reed was commissioned to prepare the design of the mechanical equipment for Portland's one million dollar U. S. Court House building, Mr. James was placed in responsible charge of the project and supervision of three assistants.

In 1932 he established his own office and was licensed to practice professional engineering in the State of Oregon, which had a provision for reciprocal registration in other states. Mr. James specialized in heating and ventilating, and in addition to preparing plans and specifications of mechanical apparatus, he awarded contracts, prepared estimates and supervised the construction and installation of the equipment.

In June 1932 he was selected from over fifty applicants by the Board of Regents at the University of Wisconsin for a two-year appointment as Research Fellow in the Department of Mechanical Engineering, specializing in heating and ventilating and air conditioning.

He was appointed engineer for General Electric Co., Schenectady, N. Y. and assigned to the air conditioning laboratory testing boilers, fans, room units and refrigerating condensing units. In this connection his work included the complete testing of the first shop model of an air-cooled conditioning unit which was in the stage of engineering development.

He became Technical Assistant of the Society in April, 1935 and later became Technical Secretary, from which position he resigned in February, 1943 to take up his duties with Iron Fireman Manufacturing Co., Cleveland, Ohio.

During his seven years' service with the Society his responsibilities included the preparation of technical data for the HEATING, VENTILATING, AIR CONDITIONING GUIDE, the correlation and administration of the cooperative research program of the Society, as well as work with the technical and code committees.

He became a junior member of the Society in 1932, was advanced to Associate grade in 1936 and served as a member of the Committee on Research for a three-year period from 1943–45. During this time he presented several papers before the Society and spoke at various chapter meetings throughout the country. He served as a member of the Technical Advisory Committees on Radiation and Comfort and Cooling Load in Summer Air Conditioning. He is affiliated with the Northern Ohio Chapter of the Society and has served as alternate on its Nominating Committee and as a member of its Board of Governors. He served as a member of the Guide Publication Committee in 1943.

Mr. James is the author of a number of technical articles and is a member of the *ASME*, of the Sigma Xi and a member of the *National Honorary Scientific Society*.

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F. J. Kurth, New York, N. Y., vice-president and technical manager, Anemostat Corporation of America, was born at Cologne, Germany, on August 16, 1892, where he attended the Höhere Maschinenbau Schule.

His apprenticeship was with the Walter & Co., steam boiler works in Cologne, where he worked as draftsman. Following this, he was draftsman for Green & Son at their offices in Cologne and in Wakefield, England.

He was a prisoner of war from 1915-1919. Upon his release he established himself as technical factory manager of Gebr. Kurth Apparatlebau, Cologne. In 1926 he became managing director of Wassmuth-Kurth & Co., Cologne, manufacturers

John James

F. J. Kurth

of air conditioning apparatus and installations based mostly on his own inventions and designs. This position he held until 1933 when he became managing director for the International Anemostat Holding Co., Ltd., London. During these years 1934-37 he was technical director for Anemostat Corporation of America coming to the New York office in 1937. From 1929-1937 he acted as technical adviser on air conditioning and air flow for Anemostat in Scotland, Paris, Brussels, London and Cologne.

Mr. Kurth is an inventor and co-inventor of about 200 patents and patent applications in most of the civilized countries, referring to air conditioning devices and apparatus. Most of these patents are in general use.

He joined the Society in 1937, has been a regular attendant at Society meetings, and has been interested and active in Society activities.

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Thomas H. Urdahl, Washington, D.C., recently released as Captain by the Navy, born July 8, 1901 at Colorado Springs, Colo., received his early education in Madison, Wis. and Philadelphia, Pa. He later studied mechanical engineering at Swarthmore College, Swarthmore, Pa., and in addition, studied physics, economics and business law.

He entered the employ of Col. P. M. Anderson, architect, Washington, D.C., in 1922 and was responsible for the design, supervision and coordination of construction projects. In 1926 Mr. Urdahl opened his own office as consulting and advisory engineer for mechanical and electrical systems in power, heating, ventilating, and air conditioning.

In 1927 he was associated with A. M. Daniels, consulting engineer and technical author, Washington, D.C. He prepared and supervised the plans and specifications for the installation of heating and ventilating equipment, undertaking fuel conservation and combustion analyses, and compiled data and submitted recommendatory and advisory reports.

Operating from his own office again in 1928 he prepared heating and ventilating designs, plans and specifications and supervised the in-

T. H. Urdahl

stallation of systems in more than thirty-five structures.

Mr. Urdahl joined the ASHVE in 1930 and has been an active member since that time. He served as a member of the Society's Council from 1940-1945 and during these years served as chairman of the Committee on Admission and Advancement and as a member of the Meetings, Membership and Standards Committees. He has also served as a member of the Committee on Research from 1938 to date and as a member of both its Executive and Finance Committees for several years. He served as chairman of the Technical Advisory Committee on Weather Design Conditions from 1938 to date, and as a member of the Special Committee on the Code of Procedure for Guidance of Committee on Admission and Advancement in 1939. Other Committees on which Mr. Urdahl served are the Technical Advisory Committees on Fuel and on Sound Control, and on the Society's Joint Committee on Standards for Residence Heating.

An active member of the Washington, D.C. Chapter he served as its president in 1939 and as a member of its Board of Governors for many years.

Mr. Urdahl also holds membership in the *American Association of Engineers, Washington Society of Engineers, National Education Association*, of which he is a Life Member, Delegate D.C. Council of Engineering and Architectural Societies, Washington Board of Trade, Columbia Historical Society, Cosmos Club, *Washington Executives Association*, Washington Building Congress, and the *Norwegian Society of Washington*.

He is consultant to the Social Security Board on temperature limits for office workers and a member of the Advisory Committee to the President's Committee on Civil Service Improvement, and a lecturer in engineering at George Washington University. He is listed in *Who's Who in Engineering* (1937), and *Who's Who in America* (1928

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HOMER HOSKING NAMED PRESIDENT OF REPUBLIC BOILER

Homer L. Hosking, formerly vice-president of the United States Radiator Corp. and its Pacific Steel Boiler Division, has been elected president of the newly formed Republic Boiler Corp., 30 Church St., New York, N.Y. Willard Scott is Secretary.

The Company will handle all sales for Republic residential steel boilers which will be manufactured in sizes ranging from 400 sq ft to 1800 sq ft.

Mr. Hosking brings to the new company a wide experience in engineering, manufacturing and sales. He was graduated from the University of Michigan in 1921 with a B.S. degree in mechanical engineering. His first employment was with the United States Radiator Corp. in their Capitol testing laboratory in Detroit Mich. From 1921-24 he served as sales engineer for the company and assisted in the modernization and rebuilding of factories under J. F. McIntire. He became manager of the Dunkirk plant in 1926 and from 1929-31 he was chief engineer of the operating department. From 1931-45 he was manager of the New York area for Pacific Steel Boiler Division and in 1943 he was elected vice president of the U.S. Radiator and Pacific Steel Boiler Division.

He began the design of an improved steel heating tubeless boiler in September 1945 and during May 1946 completed negotiations for the manufacture of these boilers at Berwick, Pa.

During World War I he saw service in France and Germany. In 194 he enlisted in the New York State Guard and was assigned as assistant chief engineer with the rank of Major on the General Staff. In 1942 he was promoted to the rank of Lieutenant-Colonel and was made chief engineer officer assigned to the staff of Lieutenant-General Hugh A. Drum, and in 1944 was promoted to the full rank of Colonel.

Downtown Cleveland, Lake Erie in background

THE 53rd ANNUAL MEETING

JANUARY 27-30, 1947

"COME TO CLEVELAND"

Cleveland's City Hall

Complete details of the busy week the end of next month are given on pages 95 to 110 of this issue

Severance Hall

SUMMARY OF LOCAL CHAPTER MEETINGS*

ATLANTA—October 7. The Chapter was host to the Society Officers and Council members. Pres. W. J. McKinney, after appointing the nominating committee, turned the gavel over to Pres. Alfred J. Offner, New York, who referred to the excellent talk given earlier that day by L. P. Saunders, chairman of the Committee on Research, at the luncheon meeting at the Georgia Engineering Society. He then introduced the Society officers as follows: J. F. Collins, Jr., Pittsburgh, treasurer, who spoke on the receipt and expenditure of the Society's funds. G. L. Tuve, Cleveland, Ohio, second vice president, whose topic was *Bright Spots and Blind Spots in ASHVE,* emphasized the Society's friendly spirit, research program and THE GUIDE as the *bright spots* and the need for more social responsibility, unfamiliarity with the research program, and need for younger members as *blind spots.*

Dr. B. M. Woods, first vice president, set forth certain goals for scientific advance in his interesting talk on *Technology Tomorrow.* Some of these goals were the removal of physical burdens in the fields of food, clothing, shelter and transportation, distribution of power units, and development of machines with automatic controls. W. L. Fleisher, past president of the ASHVE, followed Dr. Woods with a talk on *Relationship of Man to Weather* in which he stressed the importance of air to life. A rising vote of thanks was given to the Society for holding its fall Council Meeting in Atlanta. Attendance 67. Attendance ratio 0.47.

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CENTRAL NEW YORK—October 16. Inspection trip through the Eastman Kodak Hawkeye Plant, Rochester. Subject: Demonstration of the Principles of Automatic Control. Speaker: G. F. Akins, in charge of Instrument Engineering, Eastman Kodak Co. His talk was accompanied by charts and working models that operated to demonstrate the principles presented. Attendance 47.

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CENTRAL OHIO—October 21. Subject: Smoke Ordinance. Speaker: R. A. Bowers, chief engineer, Division of Smoke Inspection, Columbus. Mr. Bowers read certain sections of the ordinance which he felt needed to be emphasized. This procedure resulted in a lively discussion which brought out the fact that the details of the regulations were yet to be set-up by an Advisory Board appointed by the Mayor. Messrs. Allonier and English were appointed by Mayor Rhodes to serve on this Board. Following this discussion President Allonier showed colored movies of his trip to Montreal for the Semi-Annual Meeting of the Society. Attendance 50. Attendance ratio 0.53.

*Note. The attendance ratios shown represent the membership attendance divided by the chapter membership. These ratios will be useful as a partial indication of interest shown by local chapter members in various types of subjects programmed by the various chapters and may be useful in deciding on subjects for chapter meetings.

CINCINNATI—September 27. Subject: Smoke Abatement. Speaker: Prof. R. R. Tucker, Washington University, St. Louis, Mo. Professor Tucker outlined the history of smoke control laws in St. Louis and described the results of the enforcement of these laws. His talk was followed by one of the most interesting question and answer periods witnessed by the Chapter. After adjournment the speaker was immediately surrounded by an interested group and the discussion was continued informally for some time. Other features: Pres. A. W. Edwards reported on the Semi-Annual Meeting in Montreal. K. B. Little, chairman of the meetings committee, reported on the tentative plans for future meetings. Following the report of the treasurer, H. K. Jennings, chairman of the finance committee, presented the budget for the 1946-47 season. H. A. Pillen discussed the proposed constitutional amendment. Attendance 64. Attendance ratio 0.22.

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DELTA—October 8. Subject: Technology Tomorrow. Speaker: Dr. B. M. Woods, Berkeley, Calif., first vice president of the ASHVE. Other Features: A. V. Hutchinson, secretary of the ASHVE, spoke on the plans for the Annual Meeting scheduled for Cleveland in January. A framed testimonial was presented to past president Grant in appreciation for his services to the Chapter. G. C. Kerr, research chairman, reported on the progress of the project on the effects of air conditioning on the education of school children in the South. Attendance 25.

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GOLDEN GATE—October 15. Subject: The Post War Era—A Challenge to Heating and Ventilating Engineers. Speaker: Alfred J. Offner, president of the ASHVE. President Offner pointed out that a challenge to consulting engineers existed in view of the present trend toward prefabricated buildings, and called attention to the necessity for additional research in heating, ventilating and air conditioning with special reference to panel or radiant type of heating and cooling. Other Features: Pres. James Gayner introduced the guests as follows: Dr. B. M. Woods, Berkeley, first vice president and charter member of the Golden Gate Chapter; C. S. Leopold, Philadelphia, prominent Society member and president of the *ASRE*; A. V. Hutchinson, New York, secretary of the Society; Daniel Hayes, president, *Heating, Piping and Air Conditioning Contractors' Association of Northern California* and past president of the *Heating, Piping and Air Conditioning Contractors' National Association.* Mr. Leopold, in referring to President Offner's talk, mentioned that many of the methods of the present heating and air conditioning were in use in various forms in ancient times. He spoke on THE GUIDE and stated that when he was chairman of the 1942 Guide Publication Committee, the Committee had rearranged the chapters to have a more logical order. He also pointed out that THE GUIDE was the best publication of its

kind, but that there was still some fundamental data not yet available and he urged that experts in their particular field should make available to the Society any information they might have, especially with reference to the last chapter. Mr. Hutchinson called attention to the fact that at the present time California has two representatives on the Council, one from the Golden Gate Chapter and one from Southern California. He announced that the total Society membership now stands at 5086 members with 38 Local Chapters in the United States. Mr. Hutchinson also brought out that the 1946 GUIDE was distributed to 15,500 persons and it was expected that 17,000 copies of the 1947 edition would be printed. President Gayner called upon Mr. Hayes who pointed out that the heating, piping and air conditioning contractors were very closely related in their work with the heating and ventilating engineers, and that they have set aside a fund to assist the ASHVE in its research work. Attendance 65.

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ILLINOIS—October 14. Subject: The Future of Atomic Energy as a Source of Industrial Heat. Speaker: Dr. Norman Hilberry, associate director, Argonne National Laboratory, Chicago. He explained some of the important steps in the development of the present nuclear energy plants and described the difficulties encountered in getting materials and in their operation and maintenance. Other Features: E. M. Mittendorff was appointed to fill the vacancy on the legislative committee due to J. S. Locke's moving to Minneapolis. On motion of W. A. Kuechenberg, A. G. Stout was unanimously nominated to replace Mr. Locke on the Board of Governors. Attendance 99. Attendance ratio 0.52.

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IOWA—October 8. Subject: Unit Ventilation for Schools. Speaker: G. T. Otis, vice president, Herman Nelson Corp., Moline, Ill. Mr. Otis gave a complete description of the evolution of the unit system of ventilation starting with the Peerless equipment in 1914, his first association being with M. G. Hubbard, originator of unit ventilators in Utica, N. Y., with the early Monarch system of ventilation for schools. He pointed out that the unit system is the unitary treatment of rooms rather than the individual unit or machine that designates the unit ventilator or thermal system. He discussed primarily the basic unit ventilator system of air distribution by a vertical high velocity jet to the ceiling to create turbulence, and restriction of the vent area outlet as fundamental in the unitary system of ventilation. He then discussed in detail the problem of introducing air at below room temperatures in order to cool the rooms. At the conclusion of Mr. Otis' talk an open forum was conducted and a very general discussion followed in which there were many questions and answers given. Attendance 25.

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INDIANA—October 25. Subject: Experimental Equipment and Methods at Cleveland. Speaker: Cyril Tasker, director of research, ASHVE Research Laboratory, Cleveland, Ohio. F. S. Boone submitted his report as treasurer. Attendance 40.

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MASSACHUSETTS—October 15. Subject: The Current Development in Radiant Heating. Speaker: Paul S. Park, the engineering service department, A. M. Byers Co., Pittsburgh, Pa. Other Features: A talking movie depicting the manufacture of wrought iron pipe, through the courtesy of A. M. Byers Co., was shown. An interesting discussion followed. Attendance 60. Attendance ratio 0.81.

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MEMPHIS—October 21. Subject: Baseboard Panel Heating. Speaker: T. J. O'Brien, Memphis. Pres. R. H. Hoshall announced the newly elected nominating committee as follows: J. D. Flinn, J. B. Lammons, A. W. Lenz, H. H. Wilson and E. G. Woodson. Attendance 25. Attendance Ratio 0.69.

MEMPHIS—September 16. Subject: An "Information Please" on Heating. Board of Experts: R. H. Hoshall, partner, Allen and Hoshall; T. J. O'Brien, T. J. O'Brien Engineering Co.; W. E. Thorpe, mechanical engineer, Hanker and Heyer. The program was prepared by E. E. Scott, chairman of the meetings committee. Mr. Thorpe read a timely article from *Refrigerating Engineering* on Quality of Air Conditioning, by Titus Fenn, and this was followed by a round table discussion. Attendance 24. Attendance ratio 0.66.

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MICHIGAN—October 14. Subject: The Veteran's Housing Program No. 1. Speaker: H. J. Quilhot, assistant district manager, Civilian Production Administration. His talk dealt with the history of shortages in the building industry, the reasons for present rules now governing the industry, the quotas allotted to the Detroit district and how they were being administered. After numerous questions were put to the speaker, a rising vote of thanks was extended for his interesting talk. Other Features: After the minutes of the previous meeting were read and adopted the announcement of the death of Tom Brown was made. It was moved and seconded that a resolution, expressing the sympathy of the Chapter, be sent to his widow and family and a copy of it be included in the minutes. An appropriate resolution was presented and adopted. Pres. F. R. Bishop introduced the chairmen and members of the various committees appointed for the year. A. E. Knibb reported on future meetings and the treasurer's report was read and approved. Attendance 57. Attendance ratio 0.42.

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MINNESOTA—October 7. Subject: Panel Heating. Speaker: Ferdinand Jehle, director of engineering, Hoffman Specialty Co. Indianapolis, Ind. Mr. Jehle reviewed a method of controlling panel heating systems with an outdoor thermostatic bulb and showed several slides to illustrate his talk. Other Features: E. L. Knowles, chairman of

the auditing committee, submitted his report which was accepted with thanks. Pres. J. E. Haines announced the committee chairmen for the 1946-47 season and then reported on the Semi-Annual Meeting in Montreal. A motion was made and passed to invite the Society to hold its Annual or Semi-Annual meeting in the Twin Cities in 1948 or 1949. Attendance 120.

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MONTREAL—October 21. Subject: Odors, Their Nature, Cause and Control. Speaker: Henry Sleik, vice-president, W. B. Connor Engineering Corp. Mr. Sleik's talk proved interesting to the members. He presented his subject with such thoroughness that it was readily understandable and constructive to the Montreal members. Various committee chairmen presented their reports before adjournment. Attendance 90.

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NEBRASKA—October 10. Subject: Panel Heating. Speaker: Ferdinand Jehle, director of engineering, Hoffman Specialty Co., Indianapolis, Ind. Mr. Jehle illustrated his talk with slides of the various installations and tables of calculations. An open discussion followed. Committee appointments were made for the coming year. Attendance 21.

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NEW YORK—October 21. Subject: Modern Practice in the Design of Piping for Elevated Temperature and Pressure. Speaker: S. W. Spielvogel, engineering dept., Consolidated Edison Co., New York. He pointed out that determination of pipe wall thickness requires a knowledge of codes, the *ASME* boiler construction code, and the *ASME* code for pressure piping which governs work outside the province of the boiler pressure code. He pointed out that the code shows that selection of material is based on pressures and not temperatures of the fluid. Mr. Spielvogel also explained the preheating that must be employed with carbon steel before welding. Following a question period in which all questions were ably and carefully answered by the speaker, a rising vote of thanks was given to Mr. Spielvogel. Other Features: President Sherbrooke announced the chairmen of the various chapter committees as follows: Program, P. B. Gordon; Membership, F. D. Lawrence; Publication, C. B. Albright; Publicity, Clifford Strock; Reception, J. E. Schechter; Christmas Party, A. A. Bearman. Attendance 92. Attendance ratio 0.57.

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NORTH CAROLINA—October 4. Subject: Society Research—Present Program and Future Possibilities. Speaker: Cyril Tasker, director of research, ASHVE Research Laboratory, Cleveland, Ohio. Mr. Tasker called attention to the many problems now confronting the Research Laboratory and the provision being made to provide complete engineering data of solutions to these for publication. He outlined the present expansion program and pointed out that additional space and facilities would enable them to carry out the work more efficiently and with a saving of time. An interesting and open discussion followed in which the members took an active part. Other Features: W. D. Graham, chairman of the nominating committee announced the slate of officers and the entire slate was elected unanimously as follows: president, C. Z. Adams; vice president, E. S. DeWitt; secretary-treasurer, M. F. DuChateau; Board of Governors, E. H. Brandt, Jr., L. L. Vaughan, and Arvin Page. The retiring president presented the gavel and framed charter to the incoming president. A vote of thanks was extended to De Parx Stimson for the interesting program. Attendance 41.

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NORTH TEXAS—October 22. Pres. E. J. Stern called the meeting to order and introduced the guests. D. C. Pfeiffer thanked those members who presented copies of the ASHVE GUIDE for use by the students at S.M.U. President Stern then announced the members of the nominating committee, consisting of Messrs. Brown, Anspacher, Gessell, McClanahan and Werner, who were appointed to draft the slate of the 1947 officers. C. R. Gardner outlined the Chapter's plans to invite the Society to hold its 1948 Annual Meeting in Dallas and a motion was made and unanimously carried. W. D. Sampson presented a Walt Disney technicolor film prepared for the Westinghouse Electric Corp., entitled "The Dawn of Better Living." It was the consensus of opinion that the picture was well executed, dealing principally with the necessity for adequate wiring. An interesting discussion followed. Attendance 50. Attendance ratio 0.76.

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NORTHERN OHIO—October 14. Subject: Radiant Heating. Speakers: Carl Weber, A. M. Byers Co., and R. C. Maher, Chase Brass and Copper Co. Other Features: R. L. Byers discussed the consulting engineer's problems; G. P. Nachman spoke on the contractor's discoveries; C. M. Humphreys commented on the research engineer's viewpoint; and K. T. Davis discussed the consumer's angle. Pres. J. E. Wilhelm announced the appointment of the nominating committee as follows: Messrs. L. T. Avery, Walter Baggaley, P. D. Gayman. Attendance 140. Attendance ratio 0.96.

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OKLAHOMA—October 14. Subject: Human Relations in Engineering. Speaker: Prof. John T. Hedges, director of Downtown Campus, Oklahoma City University. Attendance 18.

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ONTARIO—October 7. Subject Radiant Heating. Speaker: Harold A. Lockhart, chief engineer, Bell and Gossett Co. Attendance 144. Attendance ratio 0.48.

OREGON—October 17. Subject: The Post War Era—A Challenge to Heating and Air Conditioning Engineers. Speaker: Alfred J. Offner, New York, N. Y., president of the ASHVE. Mr. Offner enumerated the policies and achievements of the Society before giving his talk. He covered his topic in a unique and entertaining manner. Following Mr. Offner's talk, Prof. E. C. Willey presented an illustrated lecture covering the highlights of the Semi-Annual Meeting of the Society held in Montreal. The nominating committee was appointed as follows: A. E. Finlay, chairman; J. J. Byrne, J. Donald Kroeker, J. P. McDermott, W. J. Widmer. Attendance 71.

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PACIFIC NORTHWEST—October 18. Subject: The Post War Era—A Challenge to Heating and Air Conditioning Engineers. Speaker: Alfred J. Offner, New York, N. Y., president of the ASHVE. President Offner's talk dealt generally with the challenge to the heating and ventilating ingenuity in this post war era. President Offner was introduced by E. O. Eastwood, past president of the Society. Attendance 48.

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PHILADELPHIA—October 10. Subject: Dehumidification Protects U. S. Navy Inactive Fleet. Speaker: Prof. E. R. Queer, Pennsylvania State College. A discussion followed. Attendance 83. Attendance ratio 0.70.

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ST. LOUIS—October 1. Subject: Technology Tomorrow. Speaker: Dr. B. M. Woods, Berkeley, Calif., first vice president of the ASHVE, and director of the University of Extension, University of California. Dr. Woods' talk was expanded from the thesis that various surveys of trends had been made in the past and had proven to be quite accurate. He mentioned the fact that since 1900, six inventions had led to the expansion of large industries including, telephone, automobile, airplane, motion picture, rayon and radio. Dr. Woods pointed out that the trends indicated by the various surveys from time to time point to a need for more automatic controls. As in the past, this is the big problem facing the present day engineering profession. His talk was well received and after an interesting period of discussion J. H. Carter, chairman of the meetings committee, and B. C. Simons, president of the Chapter, both expressed their thanks to Dr. Woods for his fine talk. Attendance 39. Attendance ratio 0.47.

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SOUTH TEXAS—October 9. Subject: Technology Tomorrow. Speaker: Dr. B. M. Woods, Berkeley, Calif., first vice president of the ASHVE and director of the University Extension, University of California. Dr. Woods gave an interesting and inspiring talk and the members gave him a great ovation for his splendid address. Pres. B. P. Fisher gave great thanks to Dr. Woods and to J. A. Walsh, past president of the Chapter, for securing the Houston Country Club for the meeting place and for the delightful dinner. Attendance 20.

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VIRGINIA—October 23. Subject: What a Heating Man Should Know About Air Conditioning. Speaker: J. Mason Brown, Washington district representative, Air Conditioning and Refrigeration Div., Worthington Pump and Machinery Corp. An interesting discussion followed. Attendance 20.

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WASHINGTON, D.C.—October 15. Subject: The Engineered Btu in Politics. Speaker: Brig. Gen. W. A. Danielson, U. S. Army, Memphis, Tenn. General Danielson also gave a general history of the Chapter and the progress of the Society during the life of the Chapter. Pres. L. Bert Nye, Jr., welcomed nine past presidents of the Chapter, including L. S. Ourusoff, S. P. Eagleton, T. H. Urdahl, F. E. Spurney, F. A. Leser, R. S. Dill, J. W. Markert, W. H. Littleford and General Danielson. Each was presented with a tie clasp decorated with the Society insignia as a token of appreciation and esteem. Attendance 60.

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WESTERN MICHIGAN—October 14. Inspection Trip through the Groesbeck Building, Lansing, Mich. in joint session with the Michigan Department of Health. The members and guests were divided into four groups with a guide for each group, and the groups were conducted through the diagnostic laboratory and the blood plasma building. After the tours were completed, Dr. DeKleine, commissioner of the State Health Department, gave a short talk concerning the activities of the different bureaus in the Department of Health. Dr. Cummings, director of one of the bureaus, also gave a short talk on some of the work being carried on concerning the new electronic microscope, the crime detection laboratory and the work of blood plasma. In closing he told of how they proposed to construct their next building and suggested that the heating and ventilating engineer use some of his experiences in working with other people in the construction of other laboratory buildings. Other Features: Pres. J. W. Miller introduced Mohamed Sahab and Mr. Hussian, both natives of India, taking post-graduate courses in heating and ventilating at Michigan State College. Mr. Sahab spoke briefly concerning his native land and the importance of engineering to his country. Attendance 58. Attendance ratio 0.87.

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WESTERN NEW YORK—October 14. Subject: Experiences and Exploits in the United States Marine Corps. Speaker: James Swan from Station WJTN, Jamestown, New York. Mr. Swan carried a very humorous vein throughout his narration, which was replete with pantomines, sound effects and gestures; but terse enough in spots to carry his audience through the damp fox-holes and mortar fire with him. At the conclusion of his talk, Mr. Swan was roundly applauded by his appreciative audience. Attendance 57.

LEWIS NAMED TO NEW POST

The election of C.E. Lewis as executive vice president of the Perfex Corp., Milwaukee, responsible for all general operations of the company, has been anounced by J. K. Luthe, president. In his new position, Mr. Lewis will take over many of the duties formerly handled by the president.

Mr. Lewis, born in Minneapolis, Minn., was graduated from the University of Minnesota with a B.S. degree in 1919. He joined Perfex in 1944 as vice president and manager of the Controls Division. He was formerly with the Delco Appliance Division, General Motors Corp., Rochester, N.Y., where he served as general sales manager for five years. He originally joined the Frigidaire Division, General Motors, later becoming the air conditioning sales manager of Delco-Frigidaire Conditioning Division.

C. E. Lewis

A pioneer in the air conditioning field, Mr. Lewis has served as a consultant and as head of his own company. He was president of the Oil-Heat Institute of America from 1942 to 1945, has been a member of the executive board of the *Stoker Manufacturers' Association*, a director of the Indoor Climate Institute, and a member of the ASHVE since 1930.

CROFT ELECTED PRESIDENT OF THE *ASEE*

H. O. Croft, professor and head of the department of mechanical engineering, State University of Iowa, has been elected president of the *American Society for Engineering Education*.

Professor Croft was born in Denver, Colo., where he attended local schools. He was graduated from the University of Colorado in 1918 with a B.S. degree in mechanical engineering. After service as a private in the Air Corps during the first World War, he was discharged and entered the employ of Swift and Co., as assistant to the chief engineer at the Denver plant. Later he became associated with the Stearns-Rogers Mfg. Co., Denver, and later with Durbin Van Law, consulting power plant engineer.

He began his academic career at the University of Illinois in 1922 and obtained his M.S. degree in 1923, where he remained as an assistant professor until 1926. In 1927 Professor Croft went to Stanford University as an associate professor and in 1929 he became professor and head of mechanical engineering at the University of Iowa.

Professor Croft became a member of the Society in 1941 and has taken an active interest in the Society's research program and is now serving as a member of the Technical Advisory Committee on Cooling Load. He is also a member of the *ASME*, the *American Society of Naval Engineers*, *American Rocket Society*, Iowa City Engineering Club and an active member of the *American Society of Mechanical Engineers*. He is a past president of the *Iowa Engineering Society* and a member of Tau Beta Pi, Sigma Xi, and Pi Tau Sigma and Sigma Chi fraternities.

Other officers elected with Professor Croft are four vice presidents as follows: F. M. Dawson, dean of the College of Engineering, State University of Iowa; C. J. Freund, dean of engineering, University of Detroit; J. R. Killian, executive vice president, Massachusetts Institute of Technology; E. B. Norris, dean of engineering, Virginia Polytechnic Institute; Treasurer, J. S. Thompson, president, McGraw-Hill Book Co., New York, N.Y.; and F. L. Bishop, head of the department of physics, University of Pittsburgh, was appointed as secretary.

OURUSOFF HONORED BY AGA

Leo Ourusoff, manager of utilization, Washington Gas Light Co., Washington, D.C., was elected vice chairman of the industrial and commercial section of the *American Gas Association* at the annual convention of the association held in Octob[illegible] in Atlantic City, N. J.

Mr. Ourusoff, born in Rome, [illegible]aly, and graduated from Liége U[illegible]versity Belgium, as an electrical [illegible]ngineer, has been with the gas co[illegible]pany since 1931.

Since joining the Society in 193[illegible] he has taken an active interest i[illegible] Society activities and in the affairs [illegible]f the Washington, D.C. Chapter, serving as its president in 1937 and as a member of its Board of Governors for a number of years.

Mr. Ourusoff is also a member of the *American Society of Refrigerating Engineers*, Washington Board of Trade, Chevy Chase Club, and the Board of Governors of the Washington Building Congress.

MOHN APPOINTED PROJECT ENGINEER

H. L. Mohn has been appointed project engineer for the York-Hea[illegible] Division, York-Shipley, Inc., York, Pa., according to an announcement by Victor Lazo, general manager of the division.

Mr. Mohn, was born in Reading, Pa., attended Akron High School, Akron, Ohio, and was graduated from the University of Wisconsin in 1934 with a B.S. degree in mechanical engineering. Before joining York-Shipley he was chief engineer for Fitzgibbons Boiler Co., Inc. He joined Fitzgibbons in 1934 as research and development engineer, leaving there in 1940 to become chief engineer of Milton Manufacturing Co. He left that position in 1944 to rejoin Fitzgibbons.

H. L. Mohn

Mr. Mohn became a member of the ASHVE in 1937. He is also a member of the *ASME* and the *AST[illegible]* and is a registered professional engineer in the State of New York and the Commonwealth of Pennsylvania.

FRED INGALLS, LIFE MEMBER, DIES IN MASSACHUSETTS

Word has just been received of the death of Frederick DuBois Ingalls, consulting engineer of Reading, Mass., who died on Sunday, November 17, 1946. Mr. Ingalls, born on July 2, 1877, at Kingston, N. Y., attended Kingston Academy and was graduated from the Massachusetts Institute of Technology with an S.B. degree in June 1901.

His first assignment was with A. A. Sanborn, Boston, as assistant heating, ventilating and mechanical engineer. He left there to join the staff of the Supervising Architect's Office, Treasury Department, U. S. Government, Washington, D. C. where he spent four years as heating and ventilating draftsman. During this same time he conducted his own consulting service in heating, ventilating and mechanical engineering in Washington.

In 1905 he was appointed heating, ventilating and mechanical engineer,

F. DuBois Ingalls

in charge of the heating department and engaged in contracting and consulting engineering work with Edward Joy, heating, plumbing and electric contractor, Syracuse, N. Y.

He later moved to Marshalltown, Ia., where he became chief engineer and manager of the Engineering Department for the C. A. Dunham Co. at its home office. After many years of service with C. A. Dunham Co. he opened his own office as heating and sales engineer, Boston, Mass. About 1931 he established his office in his home at 1 Hopkins Street, Reading, Mass. where he has transacted his business for the past fifteen years.

He joined the ASHVE in 1906 and had taken an active interest in Society affairs and activities. At the January 1942 Council meeting he was elected to Life Membership in the Society. He was also a member of the *ASME* and the Masonic Aleppo Temple, Boston.

Mr. Ingalls is survived by his widow, a son, two daughters and a sister, to whom the Officers and Council of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS extend their sincerest sympathy.

Services were conducted at his home on Wednesday, November 20, and the Society was represented by W. T. Jones, past president, C. W. Larson, president of the Massachusetts Chapter, and N. J. Shaw.

CANDIDATES FOR MEMBERSHIP

The Constitution of the Society, as now amended, requires the following mode of procedure in voting on applicants for membership in the Society. All applications for membership are to be sent to the Secretary and the names of applicants and their references shall be printed in the next issue of the Journal of the Society or sent to the members in other approved manner as ordered by the Council. When replies are received from references, the Candidate's application shall be submitted to and acted upon by the Committee on Admission and Advancement as soon as possible.

When the Committee on Admission and Advancement has acted favorably upon a Candidate's application and assigned his grade, the Council shall vote upon the election of the proposed Candidate for membership by letter ballot. During the past month 143 applications for membership have been received and the names of these men and their sponsors are published in the following list.

Members are requested to scrutinize the list with care. The Committee on Admission and Advancement, and in turn, the Council, urge members to assume their share of responsibility of receiving these candidates into membership by advising the Secretary promptly of any whose eligibility for membership is in any way questioned.

All correspondence in regard to such matters is strictly confidential, and is solely for the good of the Society, which it is the duty of every member to promote.

Unless objection is made by some member by December 30, 1946, these candidates will be balloted upon by the Council. Those elected to membership will be notified by the Secretary immediately after election.

ACHEY, HENRY N., Owner, Norwood Achey Co. PROPOSERS: F. E. Baird, W. A. Streater. SECONDERS: J. H. Clark, J. E. Fowler, Jr.

ALLCORN, LUTHER H., JR., Estimator, The Bahnson Co. PROPOSERS: DeParx Stimson, Arvin Page. SECONDERS: M. G. Saunders, Jr., Harry Hoffman.

AMPHLETT, A. L. M., Engr., Mingledorff's Inc. PROPOSERS: C. L. Templin, L. L. Barnes. SECONDERS: Leo Sudderth, Jr., I. B. Kagey.

ANDERSON, GEORGE E., Student, University of Minnesota. PROPOSERS: A. B. Algren, B. F. McLouth. SECONDERS: E. F. Snyder, L. J. Krause.

ANDERSON, RAYMOND O., Research Coordinator, Minneapolis-Honeywell Regulator Co. PROPOSERS: J. E. Haines, B. F. McLouth. SECONDERS: R. M. Balch, Jr., L. J. Krause.

ANIK, BERNARD, Student, Purdue University. PROPOSERS: W. T. Miller, C. F. Boester. SECONDERS: H. G. Venemann, F. W. Hutchinson.

ATLAS, SIDNEY F., Partner, Atlas Air Conditioning Co. PROPOSERS: A. J. Natkin, F. C. Brandt. SECONDERS: J. W. Marshall, J. L. Ibison.

AVERA, WILLIAM W., Research Engr., The Bahnson Co. PROPOSERS: Arvin Page, M. G. Saunders, Jr. SECONDERS: M. D. Brown, K. W. Selden, Jr.

AYRES, JAMES M., Student, Purdue University. PROPOSERS: W. T. Miller, C. F. Boester. SECONDERS: H. G. Venemann, F. W. Hutchinson.

BACON, EARL, Mgr., M. F. Fischer & Son. PROPOSERS: R. W. Barnes, G. R. Rhine. SECONDERS: R. W. Kotzebue, L. S. Pawkett.

BAKER, MERL, Student, Purdue University. PROPOSERS: W. T. Miller, C. F. Boester. SECONDERS: H. G. Venemann, F. W. Hutchinson.

BEATY, STANFORD W., Air Cond. Engr., Arkansas Louisiana Gas Co. PROPOSERS: S. Konzo, W. E. Fitzgerald. SECONDERS: L. F. Babcock, C. A. McKinney.

BEERS, VANCE A., Buyer, Marshall-Wells Co. PROPOSERS: Edward Lokey, J. B. Banks. SECONDERS: T. H. McClung, T. E. Taylor.

BENGLE, CHARLES V., Sales Engr., Worthington Pump & Machinery Corp. PROPOSERS: H. K. Jennings, W. B. Cooper. SECONDERS: E. W. Vinnedge*, R. W. Sigmund.

BINNS, ARTHUR J. H., Owner, F. J. Baynes, Ltd. PROPOSERS: T. H. McDonald, A. Morgan. SECONDERS: L. B. Belford, C. S. Koehler.

BLAIR, DONALD W., Mech. Designer, Stone & Webster Engineering Corp. PROPOSERS: Earl Carrier, D. M. Archer. SECONDERS: E. L. Blair, J. W. Brinton. *(Advancement).*

BLAIR, HAROLD C., Owner, Harold C. Blair Manufacturer's Service. PROPOSERS: N. B. Hubbard, Walter Ziemba. SECONDERS: J. H. Spurgeon, A. E. Knibb.

BOKRY, JOHN V., Student, University of Minnesota. PROPOSERS: A. B. Algren, B. F. McLouth. SECONDERS: E. F. Snyder, L. J. Krause.

BRIDGERS, FRANK H., Student, Purdue University. PROPOSERS: W. T. Miller, C. F. Boester. SECONDERS: H. G. Venemann, F. W. Hutchinson.

BROWN, MARVIN L., JR., Student, Texas A & M College. PROPOSERS: W. E. Long, J. S. Hopper. SECONDERS: C. W. Crawford, Carl Files.

BROWN, RICHARD C., Student, Texas A & M College. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: C. W. Crawford, Carl Files.

BUTLER, PERCY M., JR., Engr., H. H. Angus & Associates, Ltd. PROPOSERS: H. H. Angus, M. S. Woollard. SECONDERS: A. M. Clark, D. L. Angus.

BUTLER, RICHARD C., Engr., Pfeifer & Shultz. PROPOSERS: A. B. Algren, F. B. Rowley. SECONDERS: B. F. McLouth, E. F. Snyder.

BYRUM, E. G., JR., Engr., The Bahnson Co. PROPOSERS: Arvin Page, DeParx Stimson. SECONDERS: M. G. Saunders, Jr., M. D. Brown.

CAMPIA, OSCAR J., Cons. Engr., Hayden, Harding & Buchanan. PROPOSERS: P. A. Croney, C. R. Swaney. SECONDERS: F. H. Brigham, W. J. Ahearn.

CARROLL, JOHN R., JR., Student, University of Illinois. PROPOSERS: S. Konzo, J. R. Fellows. SECONDERS: R. W. Roose, N. A. Buckley.

CARTWRIGHT, STEWART E., Student, Texas A & M College. PROPOSERS: W. E. Long, J. S. Hopper. SECONDERS: C. W. Crawford, Carl Files.

CHINN, GEORGE I., Chief Engr., Gerotor May Corp. PROPOSERS: J. C. Hauf, Jr., M. S. Hall. SECONDERS: F. H. Faust, T. H. Smoot.

CHUR, ROBERT R., Mgr., W. A. Case & Son Manufacturing Co. PROPOSERS: H. K. Ormsby, B. C. Goodhue. SECONDERS: C. H. Chur, C. F. Woese.

CLARK, ANDREW M., Mgr., J. Morrison Brass Manufacturing Co., Ltd. PROPOSERS: H. D. Henion, J. H. Fox. SECONDERS: V. J. Jenkinson, D. A. Stott

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CRAWLEY, JAMES B., Student, Texas A & M College. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: C. W. Crawford, Carl Files.

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DANIEL, CHARLES E., Cons. Engr. PROPOSERS: A. F. Hinrichsen, C. W. Hartmann. SECONDERS: C. C. Burton, H. H. Bond.

EATON, ROBERT L., Student, Texas A & M College. PROPOSERS: W. E. Long, J. S. Hopper. SECONDERS: C. W. Crawford, Carl Files.

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EVANSON, MEYER, Student, Purdue University. PROPOSERS: V. T. Miller, C. F. Warner. SECONDERS: A. S. Hall, Jr., L. E. [illegible]

FAGGION, ARTHUR J., Field Engr., Distel Heating Co. PROPOSERS: C. H. Pesterfield, L. G. Miller. SECONDERS: W. C. DeRoo, Frank Harbin, Jr.

FINCH, LLOYD, Archt. PROPOSERS: J. R. Stephenson, D. S. Swain. SECONDERS: R. L. Kent, E. M. Hepburn.

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GREENBERG, BENJAMIN F., Engr., A. A. Duckett, Inc. PROPOSERS: E. H. Dafter, S. E. Plewes. SECONDERS: I. Director, H. Mather.

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GUNN, FRANK, Student, Texas A & M College. PROPOSERS: W. E. Long, J. S. Hopper. SECONDERS: C. W. Crawford, Carl Files.

GUPTA, NATHODLAL, Graduate Student, Purdue University. PROPOSERS: W. T. Miller, C. F. Boester. SECONDERS: H. G. Venemann, F. W. Hutchinson.

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HORTON, MALCOLM A., Student, Texas A & M College. PROPOSERS: W. E. Long, J. S. Hopper. SECONDERS: C. W. Crawford, Carl Files.

HOSKINS, WILLIAM G., Field Engr., Bayley Blower Co. PROPOSERS: E. W. Gifford, B. M. Kluge. SECONDERS: Ernest Szekely, C. M. Burnam, Jr.

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JACKSON, GEORGE H., Student, Texas A & M College. PROPOSERS: W. E. Long, J. S. Hopper. SECONDERS: C. W. Crawford, Carl Files.

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KAUFFMAN, DAVID S., Student, Texas A & M College. PROPOSERS: W. E. Long, J. S. Hopper. SECONDERS: C. W. Crawford, Carl Files.

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PHILLIPS, HENRY W., JR., Student, Texas A & M College. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: C. W. Crawford, Carl Files.

PHILLIPS, RICHARD F., Student, Texas A & M College. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: C. W. Crawford, Carl Files.

PIERCE, CONWAY, Owner. PROPOSERS: N. B. Hubbard, Walter Ziemba. SECONDERS: J. H. Spurgeon, A. E. Knibb.

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RAMSEY, WALTER P., Partner, Power Plant Engineering Co. PROPOSERS: W. B. Morrison, Dick Blankenship. SECONDERS: W. H. Stover, Edward Lokey.

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SCHUHMANN, LLOYD W., Student, Texas A & M College. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: C. W. Crawford, Carl Files.

SHANNON, BAKER L., Engr. & Draftsman, Reg. F. Taylor. PROPOSERS: E. F. Yates, R. J. Salinger. SECONDERS: Hollis DeVine, C. S. Woodruff.

SHARP, H. ROSS, Vice-Pres., Sharp Heating Supply, Inc. PROPOSERS: R. A. Jack, W. R. Moore, SECONDERS: E. F. Steffner, H. F. Curtis.

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SIMPSON, ROBERT H., Student, Texas A & M College. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: C. W. Crawford, Carl Files.

SINGLETON, GEORGE R., JR., Student, Texas A & M College. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: C. W. Crawford, Carl Files.

SMITH, LLOYD W., Student, Texas A & M College. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: C. W. Crawford, Carl Files

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SPEARS, JOE M., JR., Student, Texas A & M College. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: C. W. Crawford, Carl Files.

SQUIER, RALPH T., Asst. Dir. of Research, Minneapolis-Honeywell Regulator Co. PROPOSERS: J. E. Haines, B. F. McLouth. SECONDERS: R. M. Balch, Jr., L. J. Krause.

STALEY, MARTIN E., Cons. Mech. Engr. PROPOSERS: R. W. Barnes, G. L. Rhine. SECONDERS: R. W. Kotzebue, L. S. Pawkett.

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THOMAS, A. D., Student, Texas A & M College. PROPOSERS: W. E. Long, J. S. Hopper. SECONDERS: C. W. Crawford, Carl Files.

THOMAS, GOODWIN G., Engr., The Bahnson Co. PROPOSERS: DeParx Stimson, Arvin Page. SECONDERS: M. G. Saunders, Jr., W. D. Graham.

THOMPSON, LEE W., JR., Student, Texas A & M College. PROPOSERS: W. E. Long, J. S. Hopper. SECONDERS: C. W. Crawford, Carl Files.

TRUCHON, LOUIS P., Sales Engr., The Trane Company of Canada, Ltd. PROPOSERS: J. P. Fitzsimons, B. J. Horsburgh. SECONDERS: R. S. Libby, S. W. Salter.

TUFFLY, HARRY J., Student, Texas A & M College. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: C. W. Crawford, Carl Files.

VANDERWEIL, R. G., Proj. Engr., Chase Brass & Copper Co. PROPOSERS: A. J. Offner, Allen Hubbard. SECONDERS: H. J. Blakeley, Leonard Zavorski.

VOGEL, GEORGE W., Partner, Pfau-Vogel Co. PROPOSERS: R. I. Drum, W. E. Goohs. SECONDERS: R. C. Blackman, C. M. Lee.

VOLLMAR, THEODORE M., Engr., Boulevard Frontage Co. PROPOSERS: M. A. Disney, D. J. Fagin. SECONDERS: W. D. Thompson, C. A. Hoppin.

WAGGLE, HARRY J., Branch Mgr., B. F. Sturtevant Co. PROPOSERS: F. E. P. Klages, G. B. Rottman. SECONDERS: M. F. DuChateau, W. H. Sullivan, Jr.

WARREN, DAVID, Sales Engr., Nash Engineering Co. PROPOSERS: R. H. Carpenter; Russell Donnelly. SECONDERS: G. A. Ulmheim, H. E. Adams.

WEAVER, CARSON D., JR., Mfrs. Agent, G. B. Houliston. PROPOSERS: G. B. Houliston, R. W. Sigmund. SECONDERS: G. L. Leuthold, M. E. Mathewson.

WERLLA, BILLY C., Student, Texas A & M College. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: C. W. Crawford, Carl Files.

WHITE, WILLIAM R., Asst. Engr., Washington Gas Light Co. PROPOSERS: L. B. Nye, Jr., L. Ourusoff. SECONDERS: H. H. Hill, J. N. Stewart.

WILDERMUTH, RUSSELL O., Design Draftsman, Brown & Mathews. PROPOSERS: J. E. Schechter, R. L. Stinard. SECONDERS: W. E. Heibel, P. D. Gordon.

WILLIAMS, FRANK K., Mech. Engr., Public Works Dept., State Government of Victoria. PROPOSERS: A. E. Atherton, W. G. Crossle*. SECONDERS: H. S. Gohlstein*, W. E. Crayton*.

WOLF, RAYMOND B., Student, Texas A & M College. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: C. W. Crawford, Carl Files.

WOOLMAN, HARRY D., Sales Engr., Minneapolis-Honeywell Regulator Co. PROPOSERS: J. A. Nicols, W. F. Uhl. SECONDERS: William McNamara, L. C. Gross.

*Non-Member

CANDIDATES ELECTED

In the past issues of the JOURNAL of the Society the names of the following men were listed as Candidates for Membership. The membership grade of each Candidate has been assigned by the Committee on Admission and Advancement and balloted upon by the Council. We are now instructed by the Council to post herewith, as required by **Art. B-III**, *Sec.* 8, of the By-Laws, the following list of candidates elected:

Members

ALBRIGHT, JOSEPH C., Cons. Engr., Davison Chemical Corp., Baltimore, Md.

BADHNI, J., Prop., Badhni Engineering & Trading Co., Teheran, Iran.

BARD, WILLIAM S., Instructor, Chicago Technical College, Chicago, Ill.

BAZZONI, JOSEPH P., Mech. Engr., John Dolio & Associate Engineers, Chicago, Ill. *(Advancement).*

BUCKLEY, MALCOLM L., Engr., Phillips Getschow Co., Chicago, Ill. *(Reinstatement & Advancement).*

FAIRBAIRN, JOHN K., Mech. Engr., Kraft Foods Co., Chicago, Ill.

FENKER, C. M., Engr., A. M. Kinney, Inc., Cincinnati, Ohio *(Reinstatement).*

HOBERG, B. NORMAN, Mech. Engr., Bureau of Reclamation, Denver, Colo.

HOSKING, H. L., Republic Boiler Corp., New York, N. Y. *(Reinstetement).*

HUNTER, RICHARD K., Mfrs. Agent, Hunter-Hoffman Co., Greensboro, N. C.

MCGARY, ROBERT O., Sales Engr., Buensod-Stacey, Inc., Charlotte, N. C.

NORRINGTON, WALTER L., Mech. Engr., William K. Karsunky, Washington, D. C. *(Advancement).*

PEISER, MAURICE B., Sales Engr., Natkin & Co., St. Louis, Mo. *(Advancement).*

POTIER, OSCAR N., Partner, Marques & Monteiro, Ltd., Lisbon, Portugal.

REED, JOHN C., Mgr., Research & Prod. Dvlpt., American Radiator and Standard Sanitary Corp., Pittsburgh, Pa.

RUDIO, H. M., Consolidated Conditioning Corp., New York, N. Y. *(Reinstatement).*

STEILEN, LOUIS J., Chief Engr., Lehigh Engineering Co., Bethlehem, Pa.

THAYER, HARDING H., Partner, The Thayer Co., New Castle, Pa. *(Advancement).*

TUTT, RICHARD D., Chief Engr., Tuttle and Bailey, Inc., New Britain, Conn. *(Advancement).*

VAN WOERT, ANDREW B., Engr., Hoboken, N. J.

WILLIAMSON, JAMES O., JR., Branch Mgr., American Blower Corp., Richmond, Va.

Associate Members

ALSCHULER, JOHN H., Student, Cranbrook Academy, Bloomfield Hills, Mich.

ARNOLD, C. J., Engr., Hensol Castle, Mental Deficiency Colony, Glamorgan, South Wales.

BARNES, WILLIS L., Sales Engr., The H. L. Thompson Co., Houston, Texas *(Reinstatement).*

BERTRAM, JOHN F., Dist. Mgr., Minneapolis-Honeywell Regulator Co., Ltd., Winnipeg, Man., Canada.

BLACKWELL, ALFRED H., Palo Alto, Calif.

BREDESON, CLARENCE R., Mfrs. Repr., Minneapolis, Minn. *(Reinstatement).*

BURKHARDT, CHARLES H., Dept. Head, YMCA Technical Institute, New York, N. Y.

CALLIS, DANIEL K., Pipe Shop Foreman, Inland Steel Co., East Chicago, Ind.

CAPRON, RODY G., Application Engr., Enterprise Engine & Foundry Co., San Francisco, Calif.

CARSON, JAMES H., Owner, Carson Pacific Boiler Service, New York, N. Y.

CLARK, HENRY G., JR., Partner, Catlett Engineers, Dallas, Tex.

CLIFFORD, LESLIE F., Asst. Chief Mech. Engr., Skidmore, Owings & Merrill, Chicago, Ill.

CORREA, BENJAMIN A., Sales & Maint. Engr., West India Mercantile Co., Ltd., Curacao, Netherlands, West Indies.
CURRIE, RAYMOND C., Engr., Pacific Heating & Sheet Metal Co., San Fancisco, Calif.

DONNEHY, JAMES J., Engr., Refrigeration Maintenance Corp., Chicago, Ill.

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Western Michigan: Organized, 1931. Headquarters, Grand Rapids, Mich. Meets, Second Monday. President, J. W. Miller, Route 5, Box 498, Lansing. Secretary, K. E. Robinson, 211 Smith Ave., Lansing 10.

Western New York: Organized, 1919. Headquarters, Buffalo, N. Y. Meets, Second Monday. President, Herman Seelbach, Jr., 45 Allen St., Buffalo 2. Secretary, F. J. Weber, 443 Delaware Ave., Buffalo 4.

Wisconsin: Organized, 1922. Headquarters, Milwaukee, Wis. Meets, Third Monday. President, E. W. Gifford, 611 N. Broadway, Milwaukee 2. Secretary, B. M. Kluge, 1817 S 66th St., Milwaukee 14.

C. A. DUNHAM, PIONEER IN HEATING INDUSTRY, LIFE MEMBER OF ASHVE, DIES AT 70

Clayton A. Dunham, Life Member of the Society, founder and chairman of the board of C. A. Dunham Co., Chicago, Ill., died on November 22, 1946 at Evanston hospital after a long illness.

Mr. Dunham, born in Battle Creek, Mich., August 25, 1876, moved farther west with his family at an early age. While still a young man he became interested in the power plant field and spent about two years in machine shop practice with Crecillous Bros., St. Louis, Mo. Subsequently he received an appointment as mechanical engineer at a Kansas state institution, Topeka. Later he served in an advisory engineering capacity with several state institutions in Iowa and in 1897 he became chief engineer of the State Soldiers' Home at Marshalltown.

He continued in this work until 1903 when, after a decade of study and experiments, he brought out the inventions upon which the C. A. Dunham Co. was then founded, and the business was started in a small basement in Marshalltown. The following year the Dunham factory was established in a wooden structure opposite the site of the present modern plant which was built in 1910, enlarged in 1913, 1917, and again in 1925.

Administrative offices were established in Chicago in 1914, to which city the general offices were moved in 1921. A pump manufacturing business was acquired by the company in 1924, and a new plant built in 1929 in Michigan City, Ind., to supplement the Marshalltown plant, wherein iron and steel was separated from copper and brass work. The nine-story Dunham office building in Chicago was completed and occupied by the C. A. Dunham Co. and its affiliated interests in 1926.

Mr. Dunham formed the C. A. Dunham Co., Ltd., in 1910 and arranged for the plant to be built at Toronto, Canada, in 1911, with additions in 1913 and 1921. Another addition and new power plant were built there in 1929.

In 1928 the C. A. Dunham Co., Ltd. of the United Kingdom was incorporated in Great Britain (with the Canadian plant as the base of supplies) and the British factory was completed in 1935.

Mr. Dunham joined the ASHVE in 1911 and served as a member of the Committee on Research for a three year term beginning in 1935. At the April 1941 Council meeting he was elected to life membership in the ASHVE, an honor which came as a surprise to him. In acknowledging this honor he said, ". . . I must admit, however, the reminder that age is creeping on amounts to almost a shock; somehow in my rather busy life I seem to have overlooked the years as they passed by."

Among the papers which he presented to the Society was one on the pressure differences in steam heating systems at the Society's 33rd Annual Meeting in St. Louis in 1927.

He is survived by his widow, and son, Aubra, to whom the Officers and Council of the Society extend their profound sympathy.

EQUIPMENT DEVELOPMENTS

For your convenience in obtaining more information about any of this equipment, see coupon on this page. Add the new products and companies listed here to your Directory Section which you received in your January 1946 Heating, Piping & Air Conditioning and thus keep your records of sources of supply up to date throughout the year. Single asterisk indicates equipment not listed in Directory Section; double asterisk equipment and manufacturer not listed.

Ships Large SO_2 Refrigeration Compressors to Oil Refinery

No. 3284—Two of the largest sulphur dioxide compressors ever made have been shipped by the Carrier Corp., 302 S. Geddes St., Syracuse 1, N.Y., to the Standard Oil Co. of California for installation in its refinery at El Secundo.

The machines will be used in an auto refrigeration solvent cycle which introduces cold sulphur dioxide into the refining process in separation of petroleum oils. Each centrifugal compressor will operate on 633 hp at 9840 rpm, has four impellers, and will be direct driven by a turbine using steam at 675 psi.

Develops Heavy Duty Industrial Exhausters for Many Applications

No. 3285—A new line of heavy duty, industrial exhausters featuring welded steel housings, which may be adjusted for direction of discharge and rotation, has been announced by Buffalo Forge Co., Buffalo 5, N.Y.

Removable front and back plates are interchangeable and are large enough in diameter so that the rotor can be removed through the side of the fan. Ten sizes of exhausters are offered with wheel diameters from 17½ to 58 in., and three rotors are available for each size. The air wheel is designed for exhausting hot air, fumes, gases, and light dust. The standard six blade material wheel is suitable for materials such as emery dust, sawdust, and chips, and the open type material wheel is designed for handling long shavings and all types of stringy material.

For handling hot gases, units of special construction are offered, and the various combinations of alloy materials for housings, wheels, and shafts, together with different types of bearings, and the use of small fans for cooling shafts and bearings are dependent on the temperature range encountered.

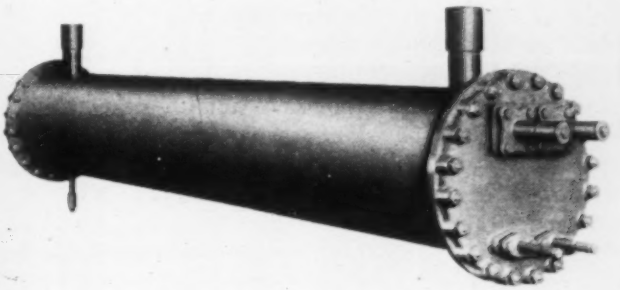
For handling corrosive fumes, exhausters may be lined with rubber, coated with lead, protective paints, or plastics, or made of alloys such as aluminum, monel, stainless steel, and "Everdur."

Capacities range from 615 cim at ½ in. static pressure to 37,824 cim at 15 in.

Direct Expansion Water Chiller Has New and Improved Head Design

No. 3286—The new Model DXG direct expansion water chiller, developed by Acme Industries, Inc., Cor. Mechanic and Ganson Sts., Jackson, Mich., incorporates a new and improved head design.

The new heads for shells of 12¾ in. diameter or larger are designed for two even refrigerant circuits, although single circuit arrangements are also avail-



able. The water flow around the tubes is controlled by the baffle arrangement and the refrigerant is controlled by the use of a thermostatic expansion valve.

Tube holes in the tube sheets are drilled and reamed and multiple concentric grooves are cut inside the holes. The tubes are then roller-expanded into the sheets.

Fabricates New Line of Large Motors

No. 3287—The Allis-Chalmers Mfg. Co., Milwaukee 1, Wis., has developed a line of outdoor weatherproof, totally enclosed motors in the larger sizes ranging up to and above 2000 hp.

Heating, Piping & Air Conditioning **[12-46]**

6 N. Michigan Ave., Chicago 2, Ill.

Please ask the manufacturers to send me more information about the equipment mentioned under the following reference numbers in Equipment Developments and Recent Trade Literature.

(Circle each number in which you are interested)

3284	3285	3286	3287	3288	3289	3290	3291	3292	3293
3294	3295	3296	3297	3298	3299	3300	3301	3302	3303
3304	3305	3306	3307	3308	3309	3310	3311	3312	3313
6346	6347	6348	6349	6350	6351	6352	6353	6354	6355
6356	6357	6358	6359	6360	6361	6362	6363	6364	6365
6366	6367	6368	6369	6370	6371	6372	6373	6374	6375
6376									

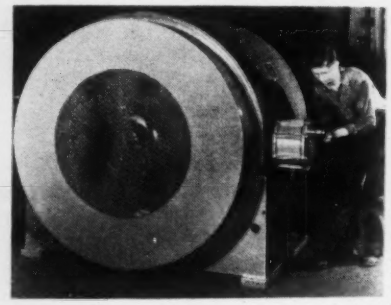
Name ..... **Title**.....

Company ....

Address .....

City ..... **Zone** ..... **State**.....

This all-fabricated steel motor is said to be especially well suited to central station power plant service in connection with draft fans and to the chemical industry. Principal change in the larger ratings is a complete redesign of the ventilation heat transfer system. All air passages are said to be practically self cleaning without pockets in which water or other liquid might be trapped. Air passage tubes are designed to be cleaned with a brush or an air or water hose.



To Make Electrostatic Precipitator for Plant Discharge Gases

No. 3288*—"Koppers-Elex" is the name of a new electrostatic precipitator for removing either solid or liquid particles from plant discharge gases. It is scheduled for early production by the Koppers Co., Bartlett Hayward Div., 200 Scott St., Baltimore, Md.

Invented in Switzerland, the unit is designed to remove boiler fly ash, tar, acid mists, soda ash, fluorides, catalysts, and other nuisances or valuable byproducts. According to the Company, which holds exclusive North American manufacturing and sales rights, the precipitators will be designed specifically for the needs of individual plants to provide any desired efficiency of removal.

Rotary Drilling of Masonry

No. 3289*—Kennametal, Inc., Latrobe, Pa., is now producing a line of drills for rotary drilling in concrete, cement, brick, slate, marble, plaster, glazed tile, asbestos, and other nonmetallic construction materials.

These drills have cutting tips of "Kennametal," a cemented carbide that is said to be much harder than tool steel, highly resistant to abrasion, and unusually strong. The manufacturer states that the strength of the material has permitted the drill to be designed so that the tip extends beyond the diameter of the shank, thereby providing generous annular clearance space around the shank. No starting punch is required when using the drill on very hard or brittle materials. The tip is said to stay hard and sharp under the heat of cutting and no coolant is required. Nine sizes of these drills are available.

Across-The-Line Starter for Squirrel Cage Motors

No. 3290*—The Master Electric Co., Dayton 1, Ohio, is offering a new, a-c across-the-line starter featuring a single push button for starting and stopping squirrel cage motors.

SOMETHING NEW HAS BEEN ADDED

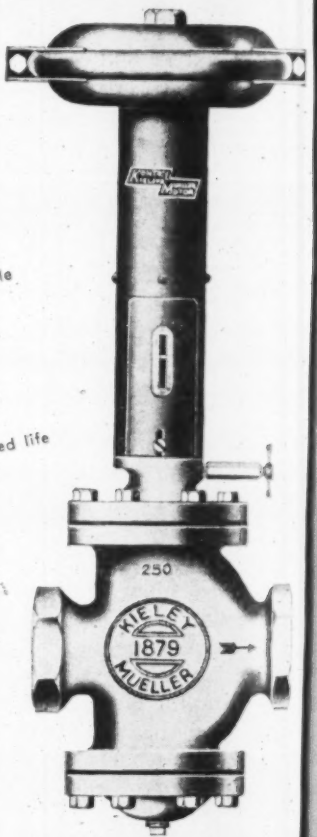
Kieley & Mueller presents

KONTROL MOTOR

Diaphragm Motor Valves
Pressure Regulators
Pump Governors

featuring

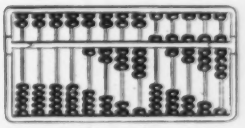
- All Steel Diaphragm Motor Unit . . . lighter, tougher, stronger, more durable
- Boltless "Duoseal" Diaphragm Casing . . . tight sealing, quick acting clamp ring; molded highly flexible neoprene diaphragm
- Steel Tubular Yoke . . . enclosing long, heat-treated, cadmium plated spring; packing gland and spring adjustment accessible through door
- Valve Position Indicator . . . standard equipment; no extra charge
- High Capacity Valve Bodies . . . unrestricted flow areas, smooth flow; available in bronze, semi-steel, cast steel, and special alloys
- Superfinished Disc Guides . . . top and bottom guided Bevel, Percentage V Port, and Parabolic discs; minimum friction, increased life
- Modern Design . . . to meet modern process requirements for better control



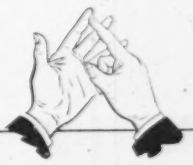
Write now for bulletin on the revolutionary KONTROL MOTOR valves.

KONTROL KIELEY & MUELLER MOTOR

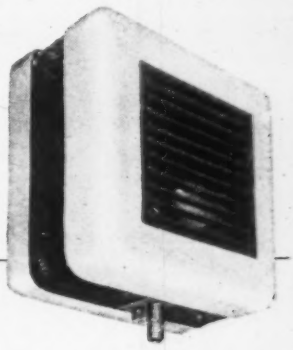
KIELEY & MUELLER, INC., NORTH BERGEN, NEW JERSEY



Whether you use an abacus



or count on your fingers



Venturafin Horizontal Type ➤

It's easy to add up the reasons for selling American Blower Unit Heaters

1. Less sales resistance—when you sell equipment that is known for sound engineering and careful construction. Ratings of our unit heaters are certified. You—and your customers—can be sure they will do the job!

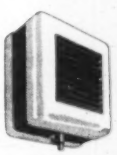
2. Complete market coverage. We build 3 types of unit heaters: (a) Venturafin Horizontal Type for general industrial use—(2) Vertical Units for ceiling application—(c) Centrifugal Type for large hard-to-heat areas. Whether you are selling a giant industrial or a small store, you'll find the right type and capacity to meet your requirements in the American Blower line.

3. Profitable follow-up sales. The sale of unit heaters can frequently lead to other profitable sales. Whether you need a unit heater, ventilating equipment or heating and cooling coils, American Blower can fill those needs. This means one source of supply for you—one source of technical information—less red tape—*regardless of the requirements of the job.*

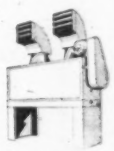
It's as simple as 1-2-3 when you sell ABC!

Ask your jobber or call the nearest American Blower Branch Office for complete information.

Vertical Type Unit Heaters



Venturafin Horizontal Type Unit Heaters



Centrifugal Type Unit Heaters

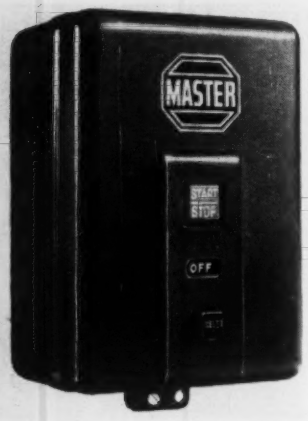
AMERICAN BLOWER

AMERICAN BLOWER

AMERICAN BLOWER CORP., DETROIT 32, MICH.

Division of American Radiator & Standard Sanitary corporation

The unit is of the solenoid type and uses bridging type contacts and an "on-off" indicating flag. The single push button is furnished in starters where the control is located in the cover as well as in remote control stations. In this latter case the mechanism consists of a single push button operating through a toggle to (1) close the contacts of the control circuit in the remote station thereby energizing the starter solenoid coil and closing the main contacts, in addition to energizing the holding magnet in the push button station, (2) lifts the "off" flag from the window leaving the "on" flag visible, and (3) moves the bar of the holding magnet against the core thereby maintaining pressure on the control circuit contacts after the push button is released.

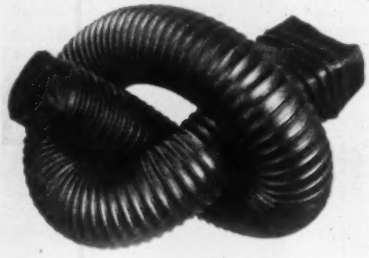


According to the manufacturer, one single remote control station can be used with a starter of any voltage from 110 to 550 or a frequency from 25 to 60 cycles. For applications where multiple remote control of a single starter is required, the conventional two button station is available.

Light Weight Ventilating Hose Simplified

No. 3291—A new "Continuous Wind" process for the manufacture of light weight, spiral-wire-reinforced ventilating hose and accessories has been announced by the American Ventilating Hose Co., 15 Park Row, New York 7, N. Y.

Using neoprene precoated fabrics, the new process provides for the manufacture of continuous hose lengths in any required diameter from 1 to 24 in. It is said to simplify any construction changes that may be necessary to secure various degrees of flexibility, compressibility, crushing resistance, and other physical characteristics. Cuffs, reducers, flanges, etc., may be permanently attached to any of the hose lengths if required.



Reflective Roof Coating

No. 3292—The Richkraft Co., 228 N. La Salle St., Chicago, Ill., has announced the availability of "Richlume," a new roof coating.

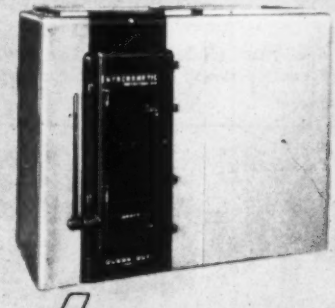
The new material is not an aluminum paint but a coating consisting of an aluminum pigment and a plastic vehicle, which has been developed for use on bituminous roofing materials only. According to the manufacturer, the coating offers high resistance to weathering, heat, cold, and salt water, as well as the ability to waterproof any bituminous roofing material which is not actually torn open or cracked too widely.

You're Invited... to see America's Finest Line of Warm Air Steel FURNACES Built for all Fuels

Exhibited at the SEVENTH INTERNATIONAL HEATING and VENTILATING EXPOSITION

Lakeside Hall
Cleveland Ohio
Spaces 59-61

COAL-GAS-OIL FIRED
Modern
STEEL
WARM AIR
FURNACES



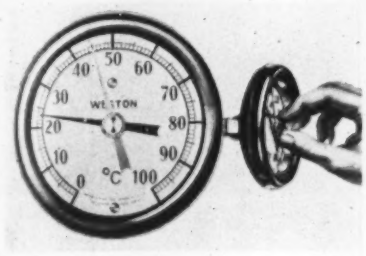
Syncromatic Corporation
WATERTOWN / WISCONSIN

insulating qualities of the surface, which is said to reflect 80 per cent of the sun's rays, are obtained from the bright reflective surface of the coating.

Thermometer for Maximum and Minimum Temperatures

No. 3293—A new all metal thermometer known as the "Max-Min," which indicates the maximum or minimum temperatures reached, has been introduced by the Weston Electrical Instrument Corp., 619 Frelinghuysen Ave., Newark, N. J.

Similar in other respects to the company's standard all metal thermometer, the new instrument has an auxiliary red index which is manually set by a finger knob which protrudes from the center of the scale glass (as illustrated).



When a record of the lowest temperature reached is desired, this index is placed to the low side of the temperature pointer. The pointer will move the index to the lowest temperature reached during any operating period, and the index will remain at that low point until manually reset. For a record of the highest temperature reached, the index is simply set at the high side of the pointer.

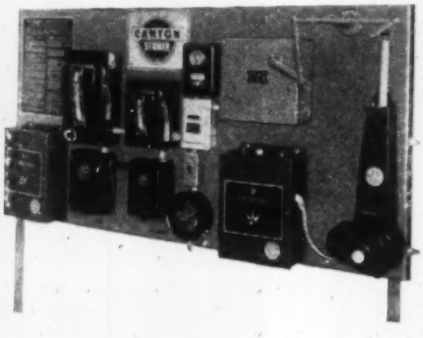
This new thermometer is now available in two models with scale diameters of either three or five inches. It is also available in all the usual ranges, and in stem lengths from 2½ to 48 in.

It is claimed that this thermometer fills the need for a low cost device which will provide an accurate record of high or low temperatures, such as on transformers, sterilizers, ovens, chemical equipment, etc., as well as in many processing operations throughout industry.

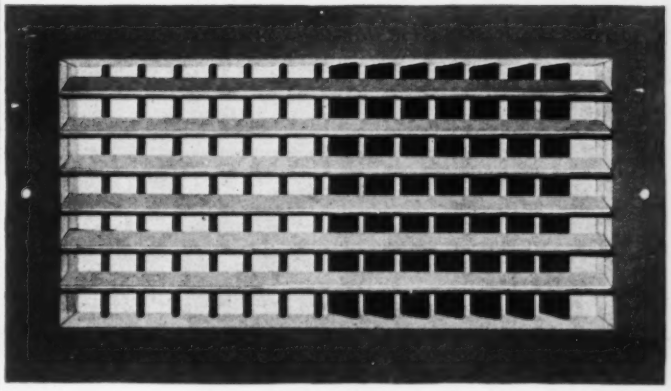
Combustion Control System for Stokers

No. 3294*—The Canton Stoker Corp., 407 Andrew Pl., S. W., Canton 1, Ohio, has announced the development of a new electric combustion control system for small and medium size stoker installations.

The system is said to differ from other all-electric combustion control systems in that the variation in coal feed on the stoker itself is effected electrically, and in addition one or more stokers can be synchronized electrically at the same time. The new control will be added to the line of combustion controls sold with the company's stokers.



HIGH VELOCITY OUTLETS



HIGH VELOCITY OUTLET

Adjusted for Down Throw and to One Side

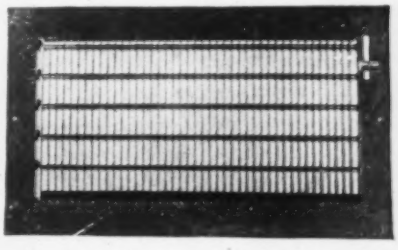
Style "DDH" illustrated above is one of eight variations of our high-velocity outlet—each bar individually adjustable with key furnished—with or without volume valves. Supplied with baked prime coat and sponge rubber gasket.

This is a heavy, attractive outlet made in all sizes, with matching fixed-bar down-deflecting return grille. Prices are competitive.

Prompt shipment of this line is available.

MANUFACTURERS OF ROOM COOLERS

We are in a position to supply variations of the High Velocity Outlet illustrated above, curved to follow the contour of your cabinet, or straight. Your inquiry is invited for prompt, helpful information.

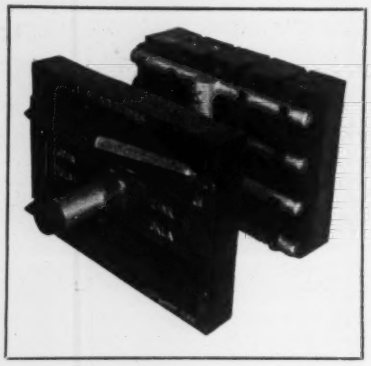


Style 74—Register—Wall or Baseboard. This Register utilizes 1" multiple-dampers to control volume and vertical direction. Multiple dampers may be set so as to obtain up, straight, or down deflection, as well as complete shut-off. The face is the same as all others of the "70" line—permitting air reflection right or left by adjusting front blades with key furnished. Blades are ¼" center to center, and ¼" in depth. Complete with rubber gasket, screw holes, prime coat. This is an attractive, well-constructed register, available promptly.

For immediate quotation and literature, Ask for Bulletin H12.

STEWART MANUFACTURING COMPANY
INCORPORATED
BLOOMFIELD, N. J.

JOHN ZINK
Refractory Type Bi-Air BURNERS



for Industrial and Commercial Installations

For all types and sizes of HEATING BOILERS and small Power Boilers—JOHN ZINK offers the Series "R" Bi-Air short flame, Gas Burner with multi-jet burners, having refractory semi-venturi mixing throats, with a separate gas orifice to each throat. Capacities to meet your requirements.

●

Especially adapted for installing in boilers having very low draft and small combustion space.

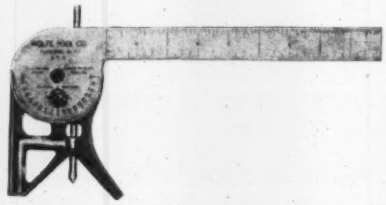
John Zink Company

4401 South Peoria
TULSA, OKLAHOMA

New York - Detroit - Salt Lake City - Houston - Los Angeles

Protractor for Layout Men

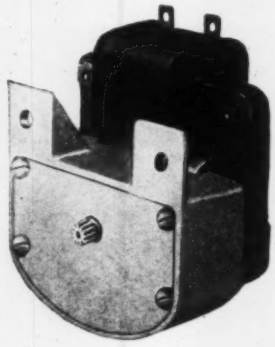
No. 3295**—A new protractor for layout men, welders, foremen, mechanics, etc. is being manufactured by the Interstate Sales Co., 1121 Broadway, New York 10, N. Y.



Salient features of the tool include (1) the "Center-Finder," used to mark four equidistant points on the circumference of any size pipe at any degree and at the same time, (2) serves as a 360 deg protractor, (3) has a 0-90-0 deg scale together with a double reading ½ in. per ft pitch scale, (4) all calibrations are etched on stainless steel, and (5) the complete tool weighs only 10 oz. All parts of this tool, which can be carried in the pocket, are of stainless steel except the frame, which is of a special magnesium, and the level container which is of yellow brass.

Self Starting, Small Synchronous Motors

No. 3296**—An input of 1½ watts produces a starting and synchronous running torque of 10 in.-oz at 1 rpm in the new self-starting, small synchronous motors offered by the Kurman Electronics Corp., 130 Clinton St., Brooklyn, N. Y.



These small motors are said to be ideally suited for use on timing devices and on controls in many industrial applications. Gears are enclosed in a die casting which supports the bearings and seals in the lubricant so that no re-oiling is required.

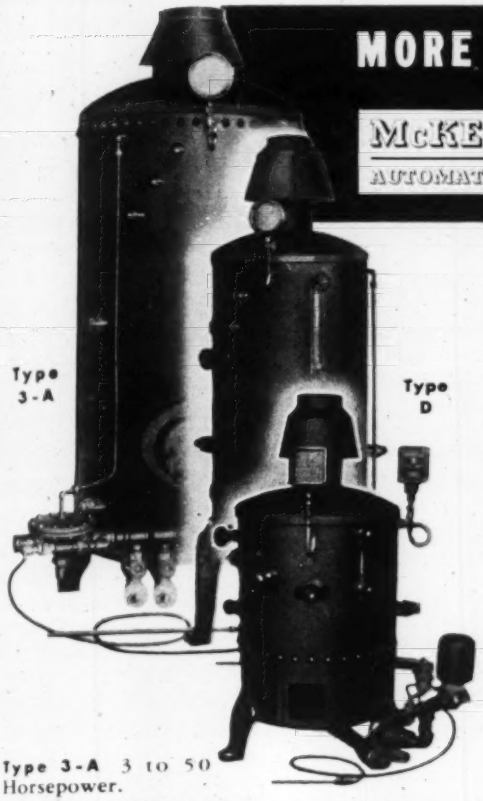
The standard motor, shown here, is designed to operate on 100-125 volts, 60 cycles, and has a load shaft speed of 4 rpm. The pinion normally provided on the shaft has 10 teeth, 64 pitch, 5/32 in. pitch diameter. Lower speeds may be obtained by adding a gear subassembly of proper ratio. Motors are also offered for voltages from 1 to 250 and for frequencies from 25 to 120, and the direction of rotation is optional.

Push Button Valve for Bleeding Air from Radiators

No. 3297**—A new air bleeder valve, known as the "Air Vent," has been developed by Curtis Automotive Devices, Inc., 8 Norwood Ave., Dayton 7, Ohio.

MORE and MORE HEATING CONTRACTORS are installing Gas-Fired "STEAMBOILERPLANTS"

McKEE AUTOMATIC



Type 3-A 3 to 50 Horsepower.
Type D ¾ to 7 Horsepower.
Type C Same size as Type D, but faster steam, ideal for gravity return.

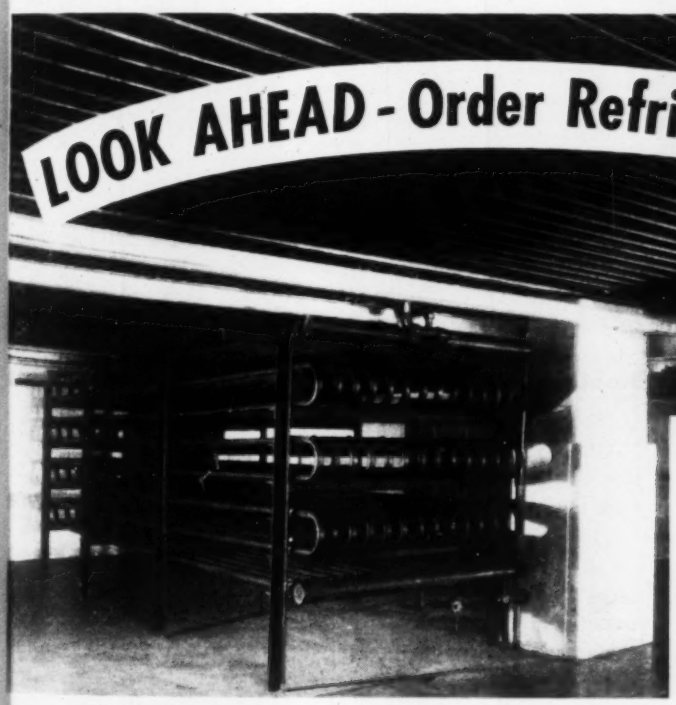
HERE'S WHY — These men know that McKee-Eclipse has had long experience in working with heating engineers and contractors on steam-generating equipment problems. Also that McKee-Automatic "STEAMBOILERPLANTS" offer this unmatched combination of advantages:— a complete Eclipse Factory-Built Unit, ready to install; Economical, due to use of small, long tubes. Complete line for generating process steam, garment pressing, compression molding, food, chemical, metal and other steam processes. *Write today for complete information. For your special steam-generating requirements, call our engineers.*

McKee Eclipse

ECLIPSE FUEL ENGINEERING COMPANY

ROCKFORD — If it's for Gas—buy Eclipse — ILLINOIS

LOOK AHEAD - Order Refrigerant Equipment NOW!



THE long years of war have put a heavy strain on refrigerant equipment . . . shortages of all kinds have made upkeep difficult, expansion impossible. Now—before warm weather—is the time to go over this equipment. Make permanent repairs and complete those long delayed improvements to increase capacity and efficiency.

Whitlock engineers have the "know how" from long experience to help you with your refrigeration problems . . . the design of condensers, receivers, welded headers, prefabricated piping, coils and allied products is a Whitlock specialty. Our manufacturing facilities are complete, with welding machines of the most modern type, heat-treating equipment, and every facility for testing by X-ray, and hydrostatic or air pressure. Get in touch with Whitlock now for recommendations and estimates.

THE WHITLOCK MANUFACTURING COMPANY

44 SOUTH STREET, ELMWOOD, HARTFORD 1, CONN.

NEW YORK BOSTON CHICAGO PHILADELPHIA DETROIT RICHMOND

Authorized representatives in other principal cities.

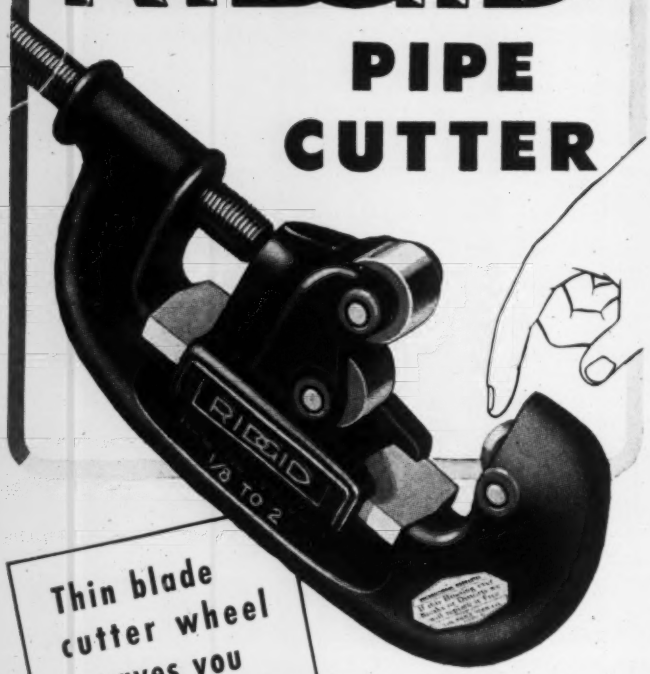
IN CANADA: DARLING BROTHERS, LTD., MONTREAL

ESTABLISHED 1891 . . . . AHEAD OF THE TIMES FOR HALF A CENTURY

You cut pipe fast, easily and clean with this efficiency-balanced

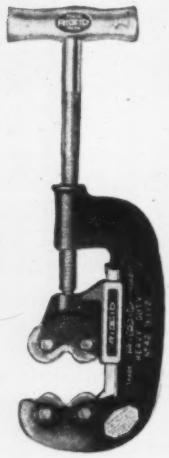
RIDGID

PIPE CUTTER



Thin blade cutter wheel saves you time and effort

● Nothing short of a motorized machine gives you as quick pipe cutting with as little work as this improved RIDGID. It "feels" efficient when you pick it up. Its new balanced malleable frame and thin-blade tool-steel wheel assure true cuts, almost burr-free — and fast — with surprisingly small muscular effort. Five factory-tested sizes meet your needs to 6" pipe. Save time—ask your Supply House for the RIDGID Pipe Cutter.



4-wheel cutters to 4" for fast quarter-turn cutting.

RIDGID

WORK-SAVER PIPE TOOLS

THE RIDGE TOOL COMPANY • ELYRIA, OHIO, U. S. A.

The vent is designed to relieve air from hot water radiators, convectors, panel radiation, pumps, and other allied units. When air accumulates it is released with finger tip pressure on the push button which is machined from brass and contains a stainless steel spring and a synthetic rubber seal. The vent is a self-contained unit which does not require the use of a key or any tools.

Special Purpose Tube Expander

No. 3298—A new tube expander, designed for use where boiler construction makes the tube inaccessible for ordinary retubing methods, has been developed by Richard Dudgeon, Inc., 24 Columbia St., New York 2, N. Y.

Designed to roll the far ends of tubes into the tube sheets in installationh where no ready access has been provided, the expander enters from the smoke box or fire door and reaches through the whole length of the tube to roll the far end. A revolving stop collar on the frame extension permits adjustments of the expander for various lengths of tubes.

The device, manufactured with a solid frame or shank, or in two parts joined by a quick-acting coupling, is furnished in a variety of sizes with tapered and flaring rollers to flare as well as expand the tubes. However, it may be obtained with tapered rolls for expansion only.

Steel Insulation

No. 3299—American Flange & Mfg. Co., Inc., 1901 R.C.A. Bldg., New York 20, N. Y., has announced that the company's "Ferro-Therm" steel reflective insulation is now available to the general public.

During the war this insulation material was used by the army, navy, and air forces, and numerous industrial concerns engaged in defense work. The material was used on many projects which included the construction of low temperature altitude chambers and rooms requiring a temperature range from –125 F to 165 F.

The insulating steel is furnished in sheets which are coated with a noncorrosive alloy of tin and lead and which are hot-dipped in palm oil. According to the manufacturer, the product reflects 90 to 95 per cent of radiant heat and is permanently efficient during the life of the building.

DEPENDABLE WATER REGULATING VALVE *Helps You Select-and Maintain-* ECONOMICAL CONDENSING PRESSURES

Balancing condensing pressure, water flow and motor load for most economical air conditioning operation is a problem you can solve more readily with the installation of the A-P Model 68-B Water Regulating Valve. With an operating head pressure range of 50 to 150 p.s.i., and easily accessible adjustment of water flow, Model 68-B can be depended upon to maintain the ideal water-flow-condensing-pressure relationship that means so much to uniformly low operating costs.

Exclusive Self-Cleaning Feature Stops "Dirt-and-Lime Troubles"

Differing radically from conventional valve design, Model 68-B Water Regulating Valve employs a molded composition seal on the valve stem. This seal moves across the polished mirror-smooth stainless steel seat with a "wiping" self-cleaning action that avoids common troubles due to dirt and lime in the water. Laboratory tested in sandy water, this sliding seal and seat showed no sign of wear after the equivalent of many years actual field use — indicating a "life-time" of water regulating service.

Write today for complete details on the A-P Model 68-B Water Regulating Valve — and other A-P DEPENDABLE Refrigeration Valves: Thermostatic Expansion Valves, Refrigerant and Water Solenoid Valves, Suction Pressure Regulating Valves, "Trap-Dri" and "Trap-It" System-Protectors, and Cooling Thermostats.

AUTOMATIC PRODUCTS COMPANY

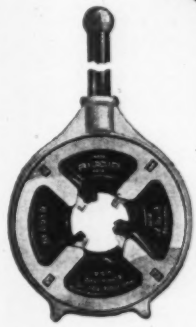
2460 North Thirty-Second Street, Milwaukee 10, Wisconsin
Export Department, 13 East 40th Street, New York 16, N. Y.

DEPENDABLE *Refrigerant Valves*
FOR AIR CONDITIONING • REFRIGERATION • HEATING

Thread pipe with almost automatic speed and ease...

RIDGID

No. 65R



Extra convenience . . . it stands up!

● Top speed in threading 1" to 2" pipe — and least monkey business getting ready — that's the self-contained No. 65R, widely popular everywhere. Workholder gauge-plate turns instantly to size — only 1 screw to tighten on pipe, no bushings to bother with. High-speed steel chasers set to size in 10 seconds, cut smooth perfect threads as if steel pipe were made of lead. You enjoy using this durable all-steel-and-malleable No. 65R — at your Supply House.

★ RIDGID ★
WORK-SAVER PIPE TOOLS
THE RIDGE TOOL COMPANY • ELYRIA, OHIO, U. S. A.

Gas house-heating hits a new high in ease and convenience . . . with the

Mueller Climatrol Type 10 Gas Boiler

It's quiet . . . clean . . . completely automatic

Your customers get long-awaited "post-war" improvements in the new Mueller Type 10 Gas Boiler. This modern home-heating unit demands minimum attention and delivers maximum comfort. It has been completely redesigned, for better appearance and better performance. New burner — exceptionally quiet in operation. Completely automatic controls. Attractive modern styling. Well-known Mueller dependability — backed by Mueller's 89-year performance record that assures you of satisfied customers. Write today for "Facts and Figures" Bulletin F-320 giving full details.

L. J. Mueller Furnace Co.

2007 W. Oklahoma Avenue • Milwaukee 4, Wisconsin

MUELLER Climatrol

Redesigned Diaphragm Gas Valves Have Mechanical Limit

No. 3300—The White-Rodgers Electric Co., 1209 Cass Ave., St. Louis 6, Mo., has redesigned its line of diaphragm gas valves.

Said to be applicable for all types of domestic and small industrial heating applications, the valves are offered in sizes from ¾ to 2½ in. and in capacities from 425 to 2500 cu ft per hr (based on 0.6 specific gravity gas at ½ in. pressure drop). A built-in high temperature, mechanical limit control is an optional feature on all valves which are designed for use with natural, manufactured, or mixed gas. This feature is designed to provide protection of the heating plant without dependence on electric current. The diaphragm is made of a synthetic material, which the manufacturer states will not dry out or shrink and which is assembled with a separate valve disc of oil-treated leather.

In the event of power failure, the valves may be operated manually and will recycle to normal automatic control on resumption of electric service.

Pulsation Dampener Exhibited

No. 3301—A working model of the pulsation dampener manufactured by The Fluor Corp., Ltd., 2500 S. Atlantic Blvd., Los Angeles 22, Calif., was exhibited at the recent National Power Show in New York City.

The device, installed on either the suction or discharge side of compressors, or both, is designed to convert pulsative flow into a steady stream and thus reduce pipeline vibration, power losses, inaccuracies in orifice meter readings, and vibration due to air surge on engine intakes. The dampener may be used in air, gas, and vapor lines wherever reciprocating type compressors are the source of power.

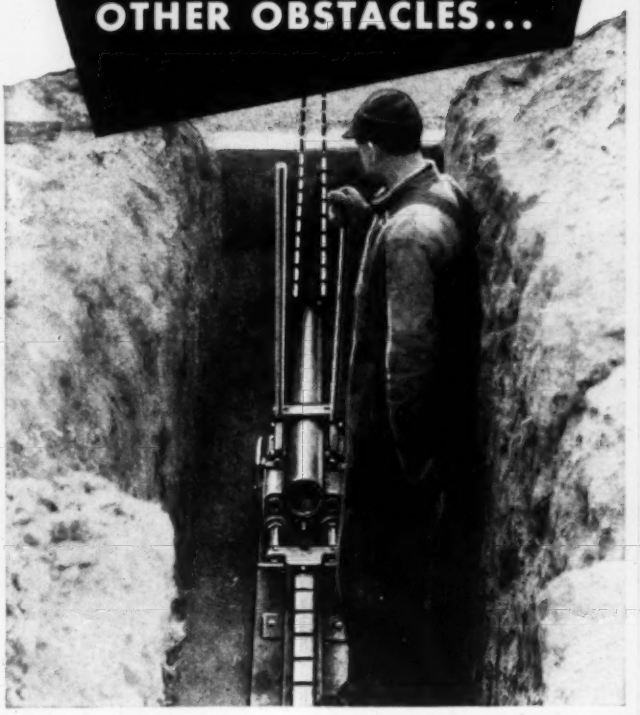
Silver Welding Alloy Melts at Low Temperatures

No. 3302—"Eutectrod" No. 1801 is a new low temperature welding rod which has been developed to provide high strength welds on ferrous and nonferrous metals by Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y.

Applied by the oxyacetylene torch, furnace, or high frequency induction heating, it is said to bond at temperatures from 940 to 1120 F and to melt at 1143 F. Shear strength of weld deposits, says the manufacturer, is 120,000 psi with good corrosion resistance and electrical conductivity being provided.

The material is available in rod, wire, strip, and powder form and it is used with a special flux.

PUSHES PIPE EASILY, QUICKLY UNDER STREETS, WALKS, FLOORS, AND OTHER OBSTACLES...



GREENLEE HYDRAULIC PIPE PUSHER

Here's how you can cut costs, save time on underground pipe installations. With a GREENLEE Hydraulic Pipe Pusher *one man* can push pipe through the ground *easily, quickly* — under obstructions!

Save the time, work and inconvenience to all caused by the old methods of tearing up floors, lawns and pavement. Eliminate tedious back-filling, tamping, tunneling, repaving (just a short trench accommodates the pusher).

Save with the GREENLEE which often pays for itself on the first few jobs used. Learn all about this compact, portable, powerful pipe installing equipment . . . get free Folder S-117. Greenlee Tool Co., Division of Greenlee Bros. & Co., 2352 Twelfth St., Rockford, Illinois, U.S.A.

REGISTERED TOOLS
GREENLEE
FOR THE CRAFTSMAN

BURIED ALIVE
in the ARCTIC!

That's what happened to the Zallea self-equalizing welding type Corrugated Expansion Joint pictured above . . . and 368 others just like it . . . in arctic Iceland!

Hot water for the capital city of Rejykavik is pumped from natural hot springs through a series of underground pipe lines fitted with Zallea Corrugated Expansion Joints. Under tons of rock and dirt these Zallea Corrugated Expansion Joints are at work . . . absorbing the thermal expansion and contraction of the pipe lines. These moving, breathing expansion joints are literally "buried alive", because there is *no* packing to deteriorate . . . *no* maintenance required . . . buried and forgotten with the full assurance that they are doing the job intended.

Zallea Corrugated Expansion Joints are made in non-equalizing, self-equalizing and duo-equalizing types, depending upon the conditions under which they must operate . . . of copper, stainless steels and other corrosion-resistant alloys . . . diameters from 3" upward . . . traverses up to 7½" . . . for pressures from vacuum to 300 psi . . . for temperatures from sub-zero to 1600°F. Let us quote on your requirements.

"Code-Craft"...
ZALLEA BROTHERS & JOHNSON
...EQUIPMENT FOR THE PROCESS INDUSTRIES
816 LOCUST ST. • WILMINGTON 99, DEL.

Specify and Demand ZALLEA
Furnace-Annealed Expansion Joints

for • SPRAYING
• WASHING
• RINSING
• COOLING
• AIR CONDITIONING

YARWAY

SPRAY NOZZLES

FAN-TYPE FOR FLAT SLICING SPRAY

Get the most out of your Spraying Equipment with minimum power . . . with efficient spraying.

Use Yarway Nozzles. No internal vanes or other restrictions to clog or hinder flow. Two types—Yarway Involute-type producing a fine hollow spray with minimum energy loss, and Yarway Fan-type producing a flat fan-shaped spray with time-saving slicing action for cleaning.

Wide range of standard sizes and capacities. Cast or machined from solid bar stock.

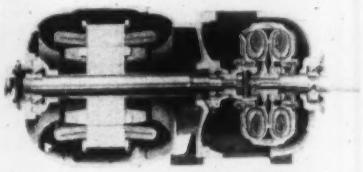
Thousands in use. Write for new Bulletin N-616.

YARNALL-WARING COMPANY
107 Mermaid Avenue Philadelphia 18, Pa.

Motor and Hydraulic Coupling Form Packaged Unit Power

No. 3303—The "Electrofluid Drive," consisting of a general purpose, a-c induction motor flange-mounted on housing which contains a hydraulic coupling, has been announced by Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.

The coupling is filled with a light mineral oil of steam turbine quality. When the motor drives the coupling impeller, it causes oil to flow through the runner buckets back to the impeller, thereby rotating the runner through the medium of oil. In this way the coupling is designed to serve as an automatic clutch with the motor starting at no load because the torque transmitting capacity of the coupling at zero speed, is zero.



Among the advantages cited by the manufacturer are smooth and easy pickup when starting, the selection of a motor based on normal load, and the prevention of damage to driven machinery.

Industrial Alarm System Signals Processing Dangers

No. 3304—The "Air-O-Larm," a new signalling assembly and system for sounding an alarm when predetermined industrial processing temperatures, pressures, or levels are reached, has been developed by Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., 4534 Wayne Ave., Philadelphia 44, Pa.

The assembly is designed to provide either audible or visual warnings of dangerous conditions and is contained in an explosionproof housing. In addition to excessive flow, pressure, and temperature, the device is said to be suitable for many other industrial processing dangers which might result from manual control and human error.

Improved Welding Head for Automatic Process

No. 3305—An improved welding head, designated as LAF-2, has been designed to simplify production installation setups and to increase the speed of operation when used with automatic welding equipment offered by The Lincoln Electric Co., 12818 Coit Rd., Cleveland 1, Ohio.

The head, normally used in conjunction with a specially built automatic welding set of 1200 amp capacity, incorporates several new features such as its ability to accommodate 3/32 in. electrodes, the use of a single control switch, the use of plugs and receptacles which are said to reduce installation time, and a new wire straightener. The manufacturer states that the new head has been used successfully in welding all types of joints including plug, butt, lap, edge, fillet, and corner.

WANT PROPELLERS *in a hurry*

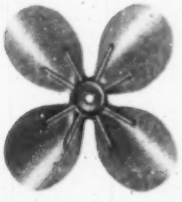
BURDEN BLADES

BURDEN can ship 'em! Not today, for we have our material and production problems, too. But prompt deliveries can be made on certain sizes of Full Pressure, Semi-Pressure and Free Air Blades. Full and Semi-Pressure Propellers are made of finished aluminum with plated steel spiders. Free Air type Burden Blades come in all steel, plated for attractiveness and rust resistance. Perfect balance assures air flow volume at its maximum. Attractive enough for any impeller equipped product—suitable for most.

Specially Designed Blades • Wire Phone • Write for Quantity Prices

Aluminum Full Pressure Type. Available in 8" thru 24" sizes.

Aluminum Semi-Pressure Type. Available in 10" thru 30" sizes.



Free Air Blades (plated steel). Available in 6" thru 12" sizes.

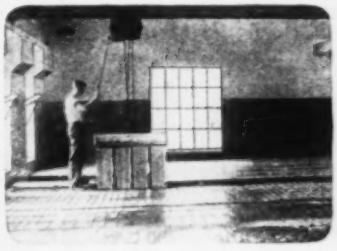
burden COMPANY

1000 N. ORANGE DRIVE • LOS ANGELES 46, CALIF.

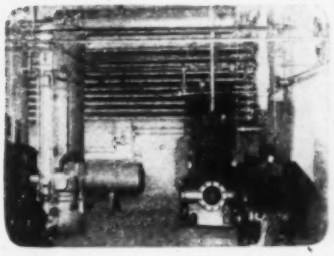
Georgia Community Refrigeration Center Makes Remarkable Growth

The City Ice Company of Gainesville started in 1929 with a 20-ton ice plant. Today it provides complete refrigeration services and operates 8 additional plants throughout Georgia, all being developed into Community Refrigeration Centers.

Typical Aisle in Locker Room, which has 1675 Compartments



Labor-Saving Equipment Harvests Four Ice Cans at Once.



One of 7 Frick Machines holding proper temps. for various services.

The original plant now makes 72 tons of ice daily; rents 1675 lockers; provides food processing and pork curing; operates extensive cold storages; quick-freezes up to 30,000 lb. of poultry per day; ices railroad cars and trucks; and sells refrigerators and appliances. The first Frick machine is still in continuous operation, six more have been added in this plant, and 15 more in the other plants.

What could a similar Community Refrigeration Center do for YOUR area? Get a copy of Frick Bulletin 126; it tells what is being done at other places, and is well illustrated. The nearest Frick Branch Office will supply details, or write

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA. U.S.A.

Boilers made in 6 sizes
up to 3040 sq. ft.
E. D. R. steam.

ALDRICH
HEAT-PAK OIL BURNERS
AND BURNER-BOILER UNITS

. . . because the name, ALDRICH, means quality! It is a reputation attained after years of manufacturing experience, engineering leadership, designing skill. For conclusive proof of performance and efficiency on the job, Aldrich HEAT-PAK products were standard equipment in U. S. Insular Bases. Aldrich, the leading oil burner manufacturer, *guarantees* satisfactory performance!

Because Aldrich will not sacrifice standards of quality, production will be slow until the shortage of good materials is overcome.

Model AX
.75 to 5.00 G.P.H.
Model BX
4.00 to 9.00 G.P.H.
Jumbo
5.00 to 19.00 G.P.H.

KNOWN and USED the WORLD AROUND!

ALDRICH COMPANY
WYOMING ILLINOIS

See Us at the Exposition—Booths 12 and 16

Condenser Tube Insert Modified

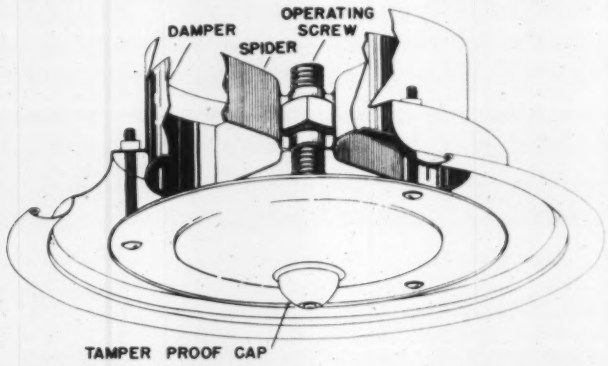
No. 3306—Condenser Service & Engineering Co., River St., Hoboken, N. J., is offering an improved "Fibreclad Flowrite" condenser insert designed to protect condenser tube inlet ends against erosion.

The unit is similar to the company's older model consisting of a belled-end metal tube except that a thin fiber sleeve is shrunk on the outside. After installation, the fiber is said to swell when in contact with water and to produce a tight seal which prevents leakage. Units are available for any size tube and in lengths to suit the erosion problem.

The company is also offering a new condenser tube leak detector which consists of a rubber body, one end of which is conical and is shaped to fit into the tube and the other end of which is a thin-walled bulb. An air passage connects the bulb with the conical end. To use the device with the condenser out of service, a vacuum is maintained in the steam space, one end of the tube is plugged, and the detector is inserted in the other end of the tube. If the bulb is sucked in, the tube leaks.

Volume Damper in Air Diffuser Simplified

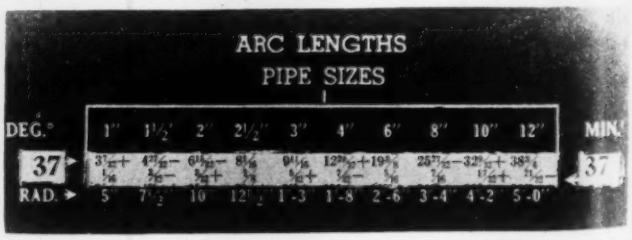
No. 3307—A simplified and improved air volume damper requiring fewer parts and featuring aluminum construction has been made a part of the "Kno-Draft" high velocity air diffusers offered by W. B. Connor Engineering Corp., 114 E. 32nd St., New York 16, N. Y.



The lightweight cylindrical damper is raised or lowered by turning the extended shank of the operating screw, centered in the lower cone and concealed by the tamperproof cap. The damper, which is an integral part of the diffuser, operates independently of the lower cone which may be dropped or raised to adjust the air flow direction.

Arc Lengths and Tangents for Pipe Bends Given on Slide Rule

No. 3308—The "Develotan" is a slide rule type calculator designed to give arc lengths and tangents of pipe bends, and is offered by the Develotan Co., 150 Nassau St., New York 7, N. Y.



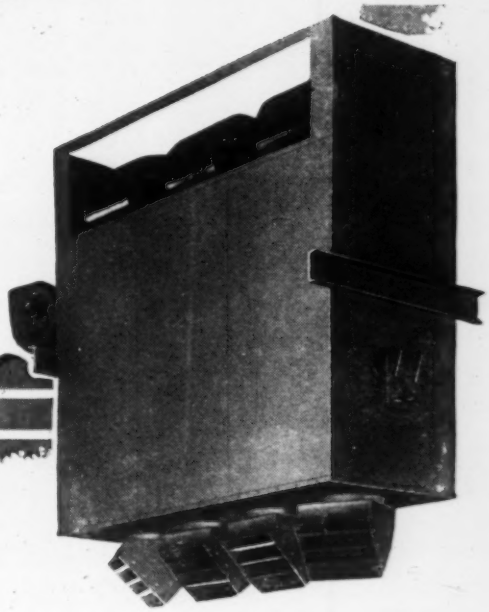
SAVE VALUABLE FLOOR SPACE WITH

AIRTHERM

DIRECT-FIRED Suspended WARM AIR HEATERS

Now Available

Airtherm suspended models are designed specifically to permit use of all available floor space, while heating your plant efficiently and economically. Control panel can be placed at convenient location near floor. Horizontal or vertical mount. Capacities from 650,000 to 1,950,000 B. T. U.

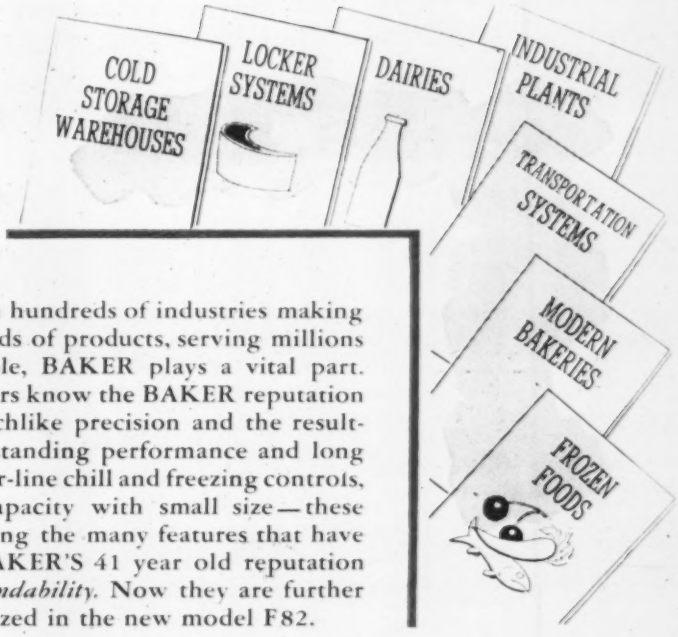


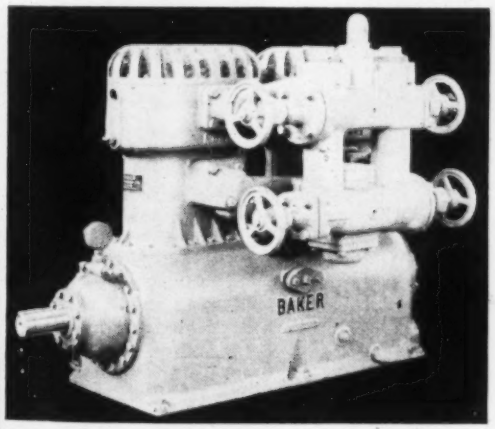
AIRTHERM
MANUFACTURING COMPANY
711 South Spring Ave. • St. Louis, Mo.

AT-49

In industries vital to the public welfare

Baker performs an invaluable service





In hundreds of industries making thousands of products, serving millions of people, BAKER plays a vital part. Engineers know the BAKER reputation for watchlike precision and the resultant outstanding performance and long life. Hair-line chill and freezing controls, great capacity with small size—these are among the many features that have built BAKER'S 41 year old reputation for *dependability*. Now they are further emphasized in the new model F82.

NEW MODEL F 82
Greater capacity in smaller size, force feed lubrication, Timken bearings, precision built—QUALITY!

BAKER ICE MACHINE COMPANY, INC., OMAHA

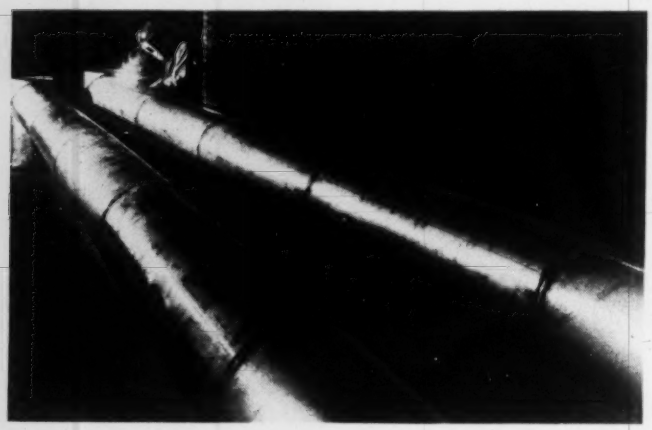
Baker

MANUFACTURERS OF DEPENDABLE REFRIGERATING EQUIPMENT SINCE 1905

The calculator gives arc lengths and tangents only where the bending radius is made to five pipe diameters, and the pipe sizes covered range from 1 in. through 12 in. in diameter. The device measures approximately 4 in. x 10 in. and is offered for use in the field, drafting room or engineering office.

Stainless Steel Stack Arc Welded

No. 3309—"Airco 19-9" stainless steel electrodes, offered by Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y., were used in arc welding the exhaust stacks shown here.



These twin 80 ft stacks are made of 18.8 stainless steel sheet and were designed to dissipate acid fumes from a dye works. The sheets were first rolled and welded longitudinally and were then welded into sections.

Offers Shell and Tube Water Coolers from 5 Tons Upward

No. 3310**—Shell and tube, flooded type water coolers ranging in sizes upwards of 5 tons are offered by Doyle & Roth Mfg. Co., foot of Hawkins St. at Central R.R. of N.J., Newark 5, N. J.

The water coolers and suction superheaters are similarly constructed incorporating steel shells and tube sheets, copper tubes, and cast iron heads. For cooling special liquids as used in industrial process work, stainless steel or copper and brass construction is available.

Detection of Smoke Based on Reflected Light

No. 3311**—The F. W. Dwyer Mfg. Co., 317 S. Western Ave., Chicago, Ill., has developed a new smoke detector, No. 925, which is designed to rapidly indicate the presence of smoke or haze by reflecting light from the smoke particles.

The unit contains a sealed chamber with openings for the passage of the flue gas sample being tested. When no smoke is present, a concentrated light beam passing through the chamber is completely invisible through the observation window. A faint haze of smoke appears in the window as a white strip and becomes brighter as the smoke concentration is increased.

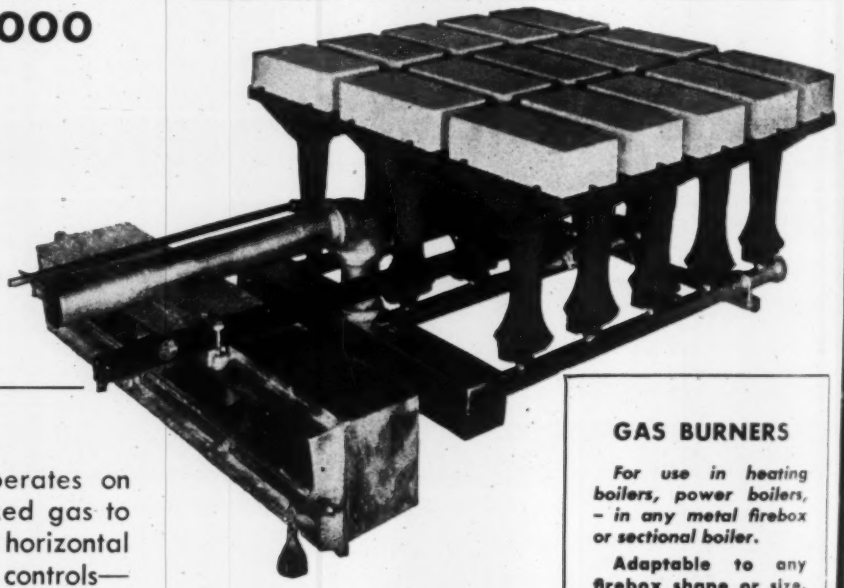
Since the device is gastight, it may be used in conjunction with a CO_2 analyzer by merely connecting the detector in the line between the stack and the CO_2 indicator, the same gas sample being used in each.

50,000 to 10,000,000 B. t. u.

WECO—N. G. E.

Series F600

GAS BURNERS



The Series F600 Burner operates on straight natural gas and mixed gas to 800 B.t.u. Gives perfect horizontal distribution. Fully automatic controls—that operate properly—can be easily applied.

Write for F 600 Bulletin

GAS BURNERS

For use in heating boilers, power boilers, – in any metal firebox or sectional boiler.

Adaptable to any firebox shape or size.

Handles various gas pressures and affects low draft loss.

THE WEBSTER ENGINEERING CO.

TULSA —DIVISION OF— **OKLAHOMA**

Surface Combustion Corp. . . . . Toledo, Ohio

TIMING MOTOR- ACCURATE DEPENDABLE

For the Makers of All Types of Timing Devices

You want controlled power—consistent power—for time controls and time switches. Power that is measured evenly with every electric impulse, giving utmost accuracy and reliability to the carefully geared machines you build. You get this power with

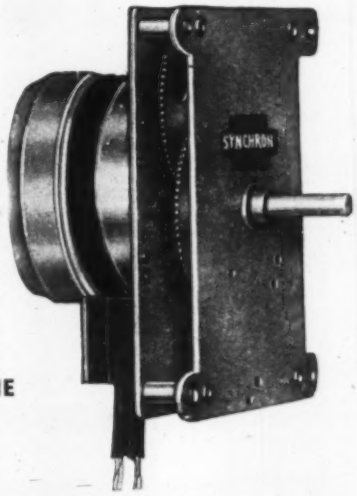
SYNCHRON

TIMING MOTORS AND TIME MACHINES

These power units are built to take it—with oil-impregnated double bearings, brass gears, hardened steel shafts—and a reputation for customer satisfaction that dates a quarter of a century.

SYNCHRON synchronus motors are small—only 2¼" by 1 5/16"—with power to pull 8 oz. direct load continuously at 1 RPM. This time-tested motor powers the SYNCHRON Time Machine, a compact little "timer" with a proved record for sustained accuracy and reliable service under all types of working conditions. For complete details, write

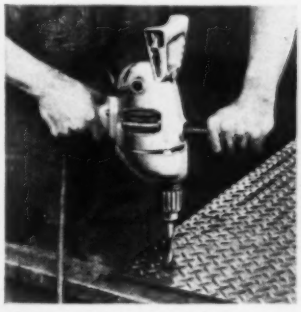
HANSEN MANUFACTURING CO., INC.
Princeton 6, Indiana



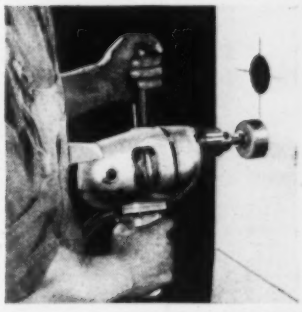
TIMING MACHINE TIME-TESTED

Black & Decker
½" STANDARD
Portable Electric Drill

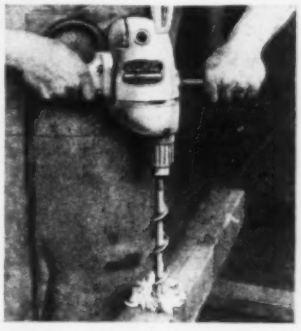
4 Big Uses for *This* Handy Drill



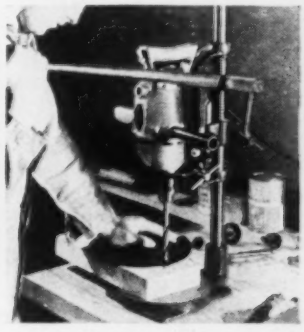
1 DRIVES TWIST DRILLS up to ½" in piping, steel plates, ducts, vents, frames, braces and other metal parts.



2 DRIVES B & D HOLE SAWS for cutting clean, round holes up to 3½" diameter in any material a hacksaw cuts.



3 DRIVES WOOD AUGERS up to 1" in hardwood for running piping through flooring and installing heating and air conditioning units.



4 MAKES A POWERFUL DRILL PRESS when mounted in a B & D Drill Stand. Gives 6-to-1 leverage; a smooth, positive feed for precise work.

ASK YOUR NEARBY BLACK & DECKER DISTRIBUTOR for full details on Drills and other Electric Tools for heating, piping and air conditioning work. Write for complete catalog to: The Black & Decker Mfg. Co., 628 Pennsylvania Ave., Towson 4, Maryland.

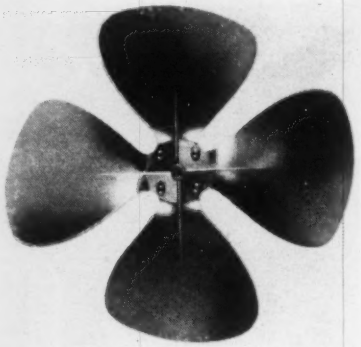
LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker
PORTABLE ELECTRIC TOOLS

Propeller Fan Blades Made Interchangeable

No. 3312—The Motionair Co., 9242 Beverly Blvd., Beverly Hills, Calif., is fabricating propeller fan blades of the single curvature type which are interchangeable and are shipped knocked-down.**

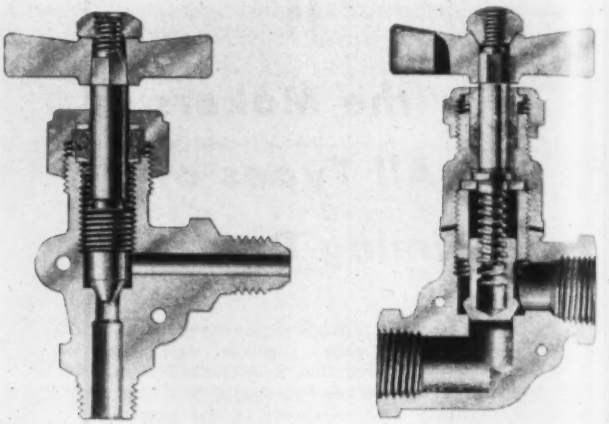
Said to be quiet and efficient in operation and low in cost, the blades are bolted to the hub. This, says the manufacturer, makes it possible to quickly replace a damaged blade, save shipping and storage space, and permit reboring the hub on a small lathe. Fabricating all four blades from a single die is said to provide balance and uniformity in shape and pitch.



Industrial Valve Line Features Small, Forged Brass Bodies

No. 3313—Production of a series of industrial valves incorporating a number of new design features has been announced by Parker Appliance Co., 17325 Euclid Avenue, Cleveland 12, Ohio.

Available in needle and globe types in sizes up to 1 in. and in both angle and offset designs, the new valves are said to be unusually small and compact by reason of forged brass bodies. Both the needle and shut-off types are available in six variations of connection arrangements. Straight-line types are produced with female pipe threads, or with tubing threads for the use of flexible tubing. Angle types are provided with female pipe threads, with tube threads, or with male pipe threads at the inlet connection and either tube or female pipe threads at the side outlet.



According to the manufacturer, reduction in pressure drop of 50 per cent over conventional designs has been achieved in the offset valve design, by the elimination of pockets, angle ports, and intricate chambers which unnecessarily consume pressure.

The shut-off valves are of the nonrising stem type and can be repacked under full flow or no flow conditions.

QUIET AS YOUR REFRIGERATOR

BINKS TYPE "B" FORCED DRAFT COOLING TOWERS

Binks Type "B" Forced Draft Cooling Towers are as quiet as a good domestic oil burner or electric refrigerator. A slow speed blower assembly which is practically noiseless takes the place of the conventional high speed propeller type fans. In addition to *extremely quiet performance* Binks Type "B" Tower has a greatly increased air to water ratio with no increase in power consumption. This gives higher efficiency and less wear and tear. Type "B" is primarily recommended for small and medium capacity water cooled refrigeration and air conditioning compressors. However, it is suitable for any other water cooling need up to 60 gals. per minute or 20 tons of refrigeration. Type "B" can be used either indoors or outdoors.

WRITE NOW FOR BULLETIN No. 700

Bulletin No. 700 describes completely Binks Type "B" Forced Draft Cooling Towers. It supplies complete specification data including dimensions and ratings. A typical performance table is included. Drop a postcard in the mail today for your free copy of Bulletin No. 700.

THERE IS A BINKS COOLING TOWER FOR EVERY WATER COOLING NEED

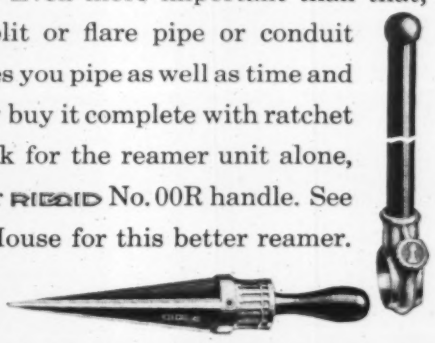
BINKS MANUFACTURING COMPANY
3114-40 CARROLL AVENUE, CHICAGO 12, ILLINOIS
Offices in all principal cities

This extra-long taper makes your pipe reaming quick, easy and safe

RIDGID

LonGriP Pipe Reamer

● The trick of its efficient performance is in that extra long taper—it reams burr cleanly from any pipe in a few easy ratcheted strokes—practically no pressure required. Even more important than that, it won't thin, split or flare pipe or conduit wall. That saves you pipe as well as time and work. You may buy it complete with ratchet handle—or ask for the reamer unit alone, which fits your RIDGID No. 00R handle. See your Supply House for this better reamer.



Reamer unit fits RIDGID No. 00R handle.

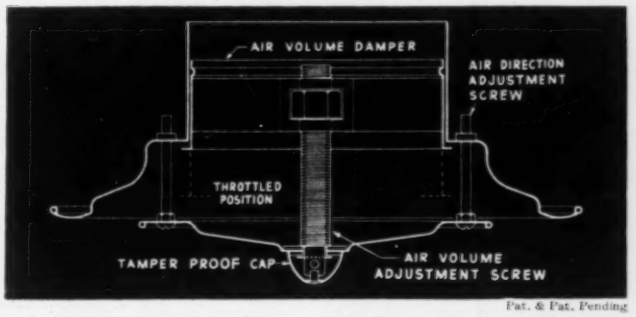
RIDGID

WORK-SAVER PIPE TOOLS

THE RIDGE TOOL COMPANY • ELYRIA, OHIO, U. S. A.

How ADJUSTABLE air diffusers increase the efficiency of supply air distribution

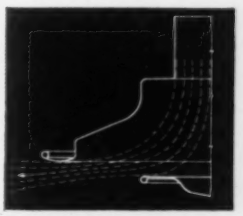
Kno-Draft Adjustable Diffusers offer all the advantages of draftless air diffusion plus fast system balancing and air pattern control



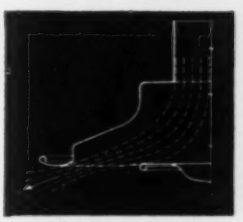
Pat. & Pat. Pending

Fast System Balancing: Volume damper regulates the air outlet aperture uniformly without affecting the outlet velocity or diffusion pattern.

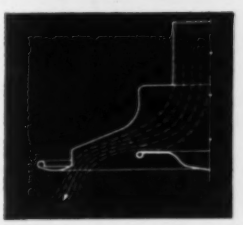
Positive Air Pattern Control: Air direction adjustment affords any angle of air discharge from vertical to horizontal needed to accommodate ceiling heights, individual or seasonal requirements. It can expel chilled air parallel to the ceiling or eject heated air downward to prevent stratification.



Specify Kno-Draft Adjustable Air Diffusers for better mixing control of room and supply air, more uniform temperatures throughout the occupied zone and noiseless, draftless air distribution.



Send for FREE handbook containing sketches, charts, dimension prints and instructive text that simplify the selection and installation of air diffusers. For your copy, please write Dept. D11 on company letterhead.

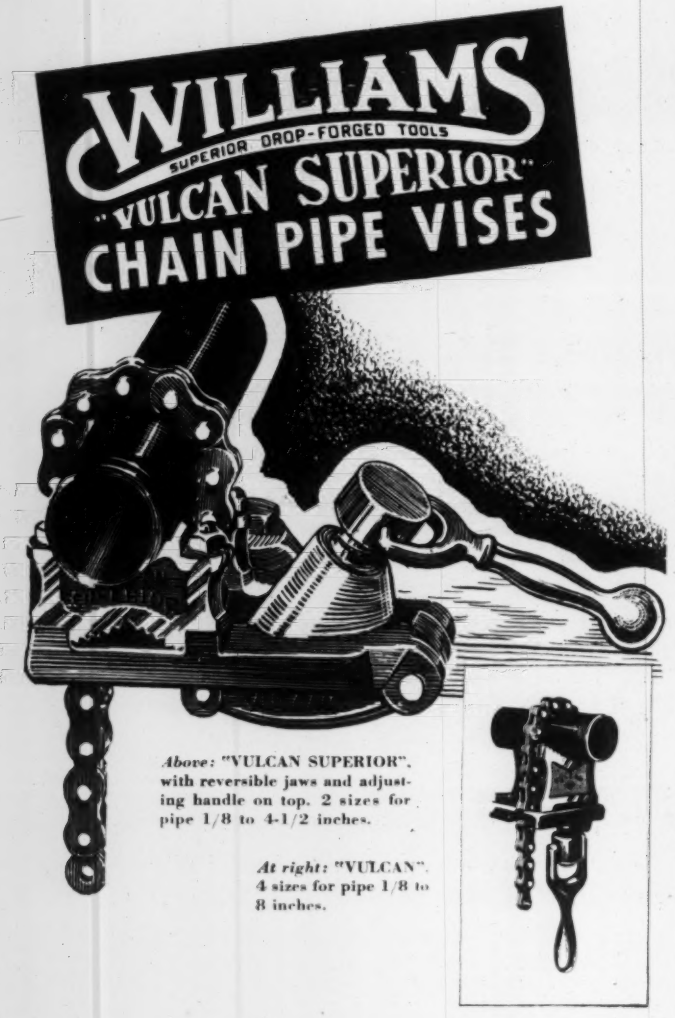


W. B. CONNOR ENGINEERING CORP.

AIR DIFFUSION AIR PURIFICATION AIR RECOVERY

112 East 32nd Street — New York 16, N. Y.

IN CANADA: Douglas Engineering Co., Ltd., 1465 Bishop St., Montreal 25, P. Q.



Above: "VULCAN SUPERIOR", with reversible jaws and adjusting handle on top. 2 sizes for pipe 1/8 to 4-1/2 inches.

At right: "VULCAN". 4 sizes for pipe 1/8 to 8 inches.

● **Williams "Vulcan Superior" is an improved vise featuring "over-head" adjustment handle ... making it easier and faster to use. Jaws are reversible providing double the service of conventional vises. It has larger capacity too. Each vise takes pipe 1/2" larger than other chain pipe vises of similar size. Like all Williams tools it is fully guaranteed. Sold by Industrial, Plumbing & Oil Field Distributors everywhere.**

J. H. WILLIAMS & CO., BUFFALO 7, N. Y.

NEW BOOKS & REPORTS

Revised Model Smoke Law Available

Example Sections for a Smoke Regulation Ordinance was prepared by the model smoke law committee, fuels division, of the American Society of Mechanical Engineers for presentation at the society's annual meeting in 1945. Designed to provide helpful information to those developing an ordinance to improve the cleanliness of air in their community, the paper is divided into 15 sections and is written in the form of a model smoke ordinance and contains numerous explanatory comments (See HPAC March 1946, page 76 for discussion of this paper).

More recently the paper has undergone a number of revisions and is now available in its latest form, known as Tentative Example Sections for a Smoke Regulation Ordinance, from the United States Department of Interior, bureau of mines, Washington 25, D.C.

While the changes have been few in number, they are significant. For example, smoke the shade or appearance of which is equal to but not greater than No. 2 of the Ringelmann Chart is permitted for a period or periods aggregating 4 min. in any 30 min. and No. 3 smoke density is now permitted for a period or periods aggregating 3 min. in any 15 min. when building a new fire or when a breakdown of equipment occurs such as to make it evident that the smoke emission was not reasonably preventable.

Section nine, which formerly applied to fuel and equipment dealers, is now applicable only to equipment dealers. The requirement that all persons engaged in selling and delivering coal must provide a certificate giving the volatile content of the fuel has been deleted.

Germicidal Treatment of Air Included in Text

The germicidal efficiency of artificial light sources has been greatly increased so that a relatively insignificant wattage far outstrips the best sunlight in killing micro-organisms, according to Matthew Luckiesh, director, lighting research laboratory, lamp department of General Electric Co., and author of a new text, Applications of Germicidal, Erythemal, and Infrared Energy.

The author, an outstanding authority on light, color, radiant energy, their uses and effects, deals with the health of human beings through the killing of airborne and waterborne bacteria by means of germicidal energy, the production and characteristics of artificial sunlight, and the applications of ultraviolet and infrared energy. Also included is a discussion of light for illumination and the radiant energy which can and does accompany it.

Of particular interest to the air conditioning engineer are the three chapters dealing with the disinfecting of controlled air, infected communal air, and disinfecting air in occupied interiors. The text contains 480, 6 x 9 in. pages, is clothbound, and is published by D. Van Nostrand Co., Inc., 250 4th Ave., New York 3. The price is $5.50.

ZINC for LONG-TIME, LOW-COST PROTECTION AGAINST RUST

The U.S. Bureau of Standards, Circular #80, says, ". . . by far the best" protective metallic coating for rust-proofing iron or steel is ZINC. Zinc, in the form of galvanizing, protects against rust in TWO WAYS: First, by simple coverage, with a sheath of rust-resistant metal . . . Second, by electro-chemical action, or "sacrificial corrosion." That's why industry has long depended on ZINC to stop rust—cut costs—save materials. Heavy coatings pay—for the heavier the coating, the better the protection, the longer the service life and the lower the cost.

ZINC INSTITUTE 2 OZ. COATING SEAL OF QUALITY

The "Seal of Quality", shown above, is the yardstick of economy in buying galvanized sheets. It signifies at least 2 oz. of Zinc per square foot!

FREE BOOKLETS

WRITE TODAY for these valuable booklets; (1) Repair Manual on Galvanized Roofing & Siding (2) Facts about Galvanized Sheets (3) Use Metallic Zinc Paint to Protect Metal Surfaces.

American Zinc Institute

Room 2612-35 East Wacker Drive, Chicago 1, Illinois

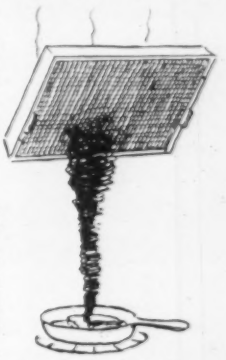
As advertised in TIME and NEWSWEEK

The lamb chop that set a hotel on fire

A hotel guest who recently asked for his lamb chop "well done" got more than he bargained for. The chef not only burned up his chop—he set the hotel on fire!

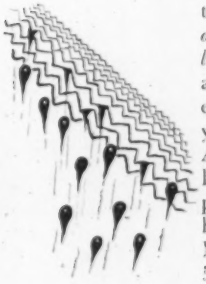
Spattering grease from the pan suddenly blazed up, and an instant later the ventilating ducts, coated with grease from the kitchen exhaust, burst into flame!

Fires in public buildings are costly, both to property and reputation. Modern commercial kitchens don't take that chance. Their range canopies are equipped with grease-removing filters, especially developed by Air-Maze—*the filter engineers*. By keeping ductwork, fan motors and blowers free from dust and cooking grease, Air-Maze Greastop filter panels save cleaning expense and eliminate the grease fire hazard. Panels are easy to clean—can be used over and over again.



How it works: The Greastop, one of many Air-Maze filters, is made up of wire meshes, which act as baffles to remove grease droplets suspended in the air stream. It offers minimum resistance to the passage of air.

Have you a filtering problem? Maybe kitchen ventilation isn't it. But whether you manufacture or use engines, compressors, air conditioning and ventilating equipment, *or any device using air or liquids*—the chances are there is an Air-Maze engineered filter to serve you better. Call your Air-Maze distributor, listed in the yellow pages of your phone book. Or write to Air-Maze Corp., Cleveland 5, Ohio.



AIR-MAZE

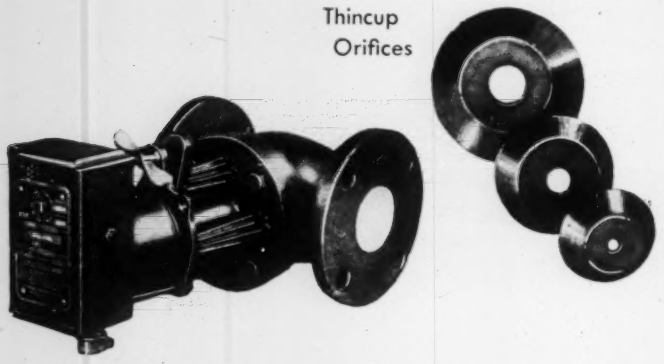
The Filter Engineers

See our exhibit at the 7th International Heating, Ventilating & Air-Conditioning Exposition in Cleveland, Jan. 27-31, 1947. Booths 67 & 69.

TALLMADGE

ON-OFF HEATING CONTROLS

Combine Simplicity and Low Cost



Type C Motorized Valve

Tallmadge On-Off Heating Controls are available in a variety of combinations that meet most heating requirements for thermostat regulation. Their advantages are widely recognized by leading engineers, heating contractors and building owners.

The controls for each zone include a rugged type "C" Motorized Valve regulated by a positive-action thermostat. The type "C" Valve shown, can, at any time, readily be converted to a modulating type valve. Thincup Orifices for insertion in radiator inlets are also provided to maintain even distribution of steam to all parts of the heating system.

Tallmadge Controls are backed by 18 years experience in meeting all steam heating requirements in institutional, commercial and industrial buildings.

Complete detail information will be supplied on receipt of an inquiry indicating your general requirements whether for On-Off or Modulating types of heating systems.

FOR IMMEDIATE DELIVERY

(1) Motorized Valves

(2) Vacuum Breakers

(3) Thincup Orifices

WEBSTER TALLMADGE & CO., INC.

364 GLENWOOD AVE., EAST ORANGE, N. J.

MEETINGS & CONVENTIONS

Stoker Manufacturers Plan Meetings

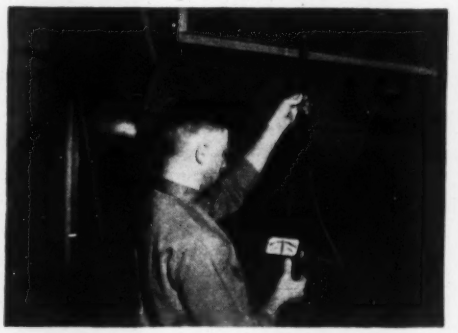
The Stoker Manufacturers Association, 307 N. Michigan Ave., Chicago 1, has selected Lookout Mountain hotel, Lookout Mountain, Tennessee, as the place for its 1947 annual meeting which will be held June 16 to 18. The next conference membership meeting of association members will be held at the Carter hotel, Cleveland, January 28.

ASTM National Meetings Announced

The American Society for Testing Materials, 1916 Race St., Philadelphia 3, has scheduled its spring meeting for February 24 to 28 at the Benjamin Franklin hotel, Philadelphia. The annual meeting, scheduled for June 16 to 20, will be held at Chalfonte-Haddon Hall, Atlantic City.

Sponsors Production Show and Three Day Conference

The Chicago Production Show, to be held March 17-19, 1947, in the exhibition hall of the Stevens hotel, will again be held in conjunction with the annual three-day conference of the 48 technical groups affiliated with the Chicago Technical Societies Council, sponsor of the show. Headquarters of the Societies Council is at 53 W. Jackson Blvd., Chicago 4.



Just use it once—

The Alnor Velometer

gives you instantaneous, direct readings of air velocity in feet per minute. Hold it in the air stream for low range readings; use the tube-connected special jets for high range readings or inaccessible locations. That's all there is to it, and once you use the Alnor Velometer you will never tolerate other methods.

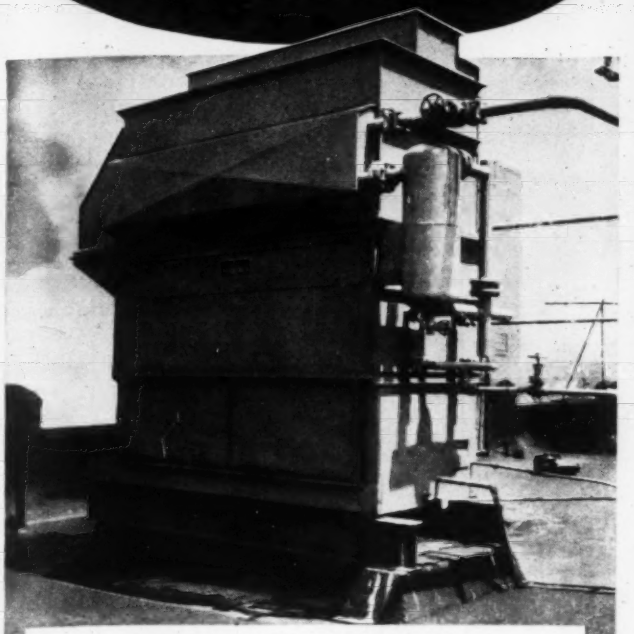
The Alnor Velometer is built in several standard ranges from 20 fpm to 6,000 fpm, and up to 3 inches static or total pressure. Special ranges available as low as 10 fpm, and up to 25,000 fpm and 20 inches pressure. Write for Velometer bulletin.

ILLINOIS TESTING LABORATORIES, INC.

420 NORTH LA SALLE STREET

CHICAGO 10, ILLINOIS

POWER SAVING FOR REFRIGERATION USERS



The NIAGARA *AERO-PASS CONDENSER saves power by permitting you to operate your compressors at the lowest head pressure that will distribute your refrigerant properly. Reducing the differential between head pressure and suction pressure makes less work for your motors and cuts your demand load.

In addition, since the NIAGARA AERO-PASS CONDENSER uses only the water it evaporates to absorb the heat in condensation, it saves expense in water and pumping. Your refrigeration plant will both gain in capacity and operate at lower cost. NIAGARA Condensers are designed and built for years of dependable service.

Ask for Bulletin No. 91-HP.

NIAGARA BLOWER COMPANY

Over 30 Years of Service in Industrial Air Engineering

405 Lexington Ave. New York 17, N. Y.

Field Engineering Offices in Principal Cities

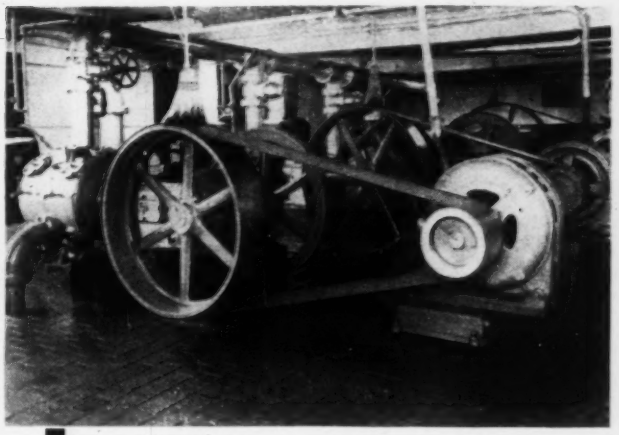
NIAGARA

***AERO-PASS CONDENSER**

*Trade-mark Registered for the Niagara Condenser with the patented Duo-Pass, Oilout and Balanced Wet Bulb Control

How to Maintain Efficiency

IN YOUR COMPRESSOR DRIVES



Your compressors are very important. Their best performance can be secured only through the use of the best type of drive . . . a drive that is absolutely reliable . . . that will not slip and that requires a minimum of attention. You can secure these qualities in a Rhoads Tannate-Rockwood short center drive which automatically maintains correct tension with varying loads. The weight of the motor on the pivoted motor base cares for load fluctuations. Rhoads Tannate leather belting has proven to be exceptionally reliable and efficient. Tannate tannage gives the physical properties needed for exacting performance of this kind. Investigate this drive. See it at the New York Power Show in December. Ask us for more information.

RHOADS

Tannate-Rockwood

SHORT CENTER DRIVES

J. E. RHOADS & SONS

35 North Sixth Street, Philadelphia 6, Pa.

NEW YORK • CHICAGO • ATLANTA

RECENT TRADE LITERATURE

For your convenience in obtaining copies of these bulletins, see coupon on page 183. If you write direct to the manufacturer, describe carefully what literature you want, as the number given first in each item is for use only when sending requests to Heating, Piping & Air Conditioning.

Ammonia Condensers

No. 6346—Ammonia condensers with tubes of 1¼ in. OD seamless steel tubes rolled into serrated holes in steel tube sheets are described in the Vol. 1, No. 7 monthly news letter released by Doyle & Roth Mfg. Co., foot of Hawkins St. at Central R. R. of N. J., Newark 5, N. J.

Central Heating

No. 6347—The Ric-wiL Co., 1562 Union Commerce Bldg., Cleveland 14, Ohio, has issued a 10 page booklet describing the municipal power system at Piqua, Ohio and emphasizing the sale of steam to nearby industries. In addition to outlining the improved operation of the utility which is provided by the sale of steam, the booklet states that many advantages in the form of fuel savings and reduction in smoke nuisance are offered to industries being served. The use of the company's prefabricated insulated pipe conduit is also described and illustrated.

Centrifugal Blower Wheels

No. 6348—"Airstream" centrifugal blower wheels of the forward curved blade type are described and illustrated in a 12 page bulletin released by Morrison Products, Inc., E. 168th and Waterloo Rd., Cleveland, Ohio. The wheels consist of two pressed end rings of soft steel with integral hubs and a one piece blade group (made from one strip of soft steel) which are spot-welded together. Housing sides, squares, and templates are also offered so that a complete blower can be assembled in a sheet metal shop.

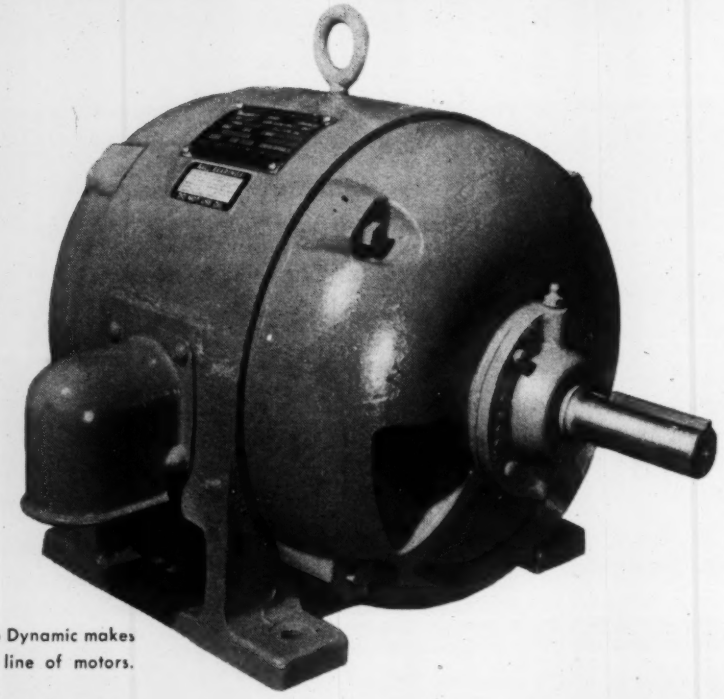
Close-Coupled Vertical Pump

No. 6349—A 20 page bulletin (No. B-159) on the specialized application of turbine pumps to installations where short pump settings are encountered and where there is a need for deep well turbine pump power and capacity has been issued by Peerless Pump Div., Food Machinery Corp., 301 West Ave. 26, Los Angeles 31, Calif.

Control of Panel Heating

No. 6350—Automatic Control of Radiant Heating is the title of a new manual published by Minneapolis-Honeywell Regulator Co., 2604 4th Ave., S., Minneapolis 8, Minn. According to J. E. Haines, vice-president, invaluable assistance was obtained in the preparation of the book from Prof. F. W. Hutchinson of Purdue University. The manual, which is to be distributed throughout the industry, contains dia-

ELECTRO DYNAMIC



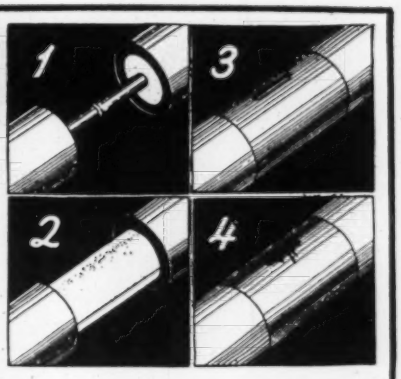
Electro Dynamic makes a full line of motors.

FAMOUS FOR DEPENDABLE PERFORMANCE

Many models of Electro Dynamic motors for refrigeration, ventilation and air conditioning are now in full production for early delivery.

ELECTRO DYNAMIC
Division of the ELECTRIC BOAT COMPANY
Bayonne • New Jersey

Positive Protection



4 Simple Steps

1. Field joint ready for inspection. 2. Joint covered with standard pipe insulation. 3. Durant joint casing in place ready for asphalt. 4. Asphalt poured in slot making a perfect seal.

UILT-IN at FACTORY

For all your underground and exposed piping jobs you'll like DURANT Pre-Sealed Insulated Pipe. It is waterproof . . . reduces installation costs to a minimum . . . eliminates electrolysis and corrosion . . . requires very little trenching and field work . . . avoids extra cost of waste and breakage . . . comes to you ready to install. In short, D.I.P. is the *perfect* type for this type of job. Investigate D.I.P.! Write for details today.

Ready to Install

PRE SEALED

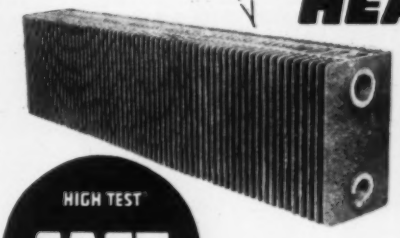
FOR STEAM HOT WATER REFRIGERATION

D.I.P. TRADE MARK

Durant
INSULATED PIPE CO.
1015 Runnymede St.
Palo Alto, Calif.

The ORIGINAL Pre-sealed Insulated Pipe

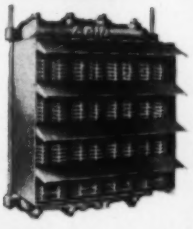
HERE'S WHY **GRID UNIT HEATERS**



will last as long as the pipes furnishing steam to them—

HIGH TEST **CAST IRON HEATING SECTIONS**

It's the material that makes the difference. GRID HIGH Test Cast Iron Unit Heaters will withstand corrosive atmospheres, and operate efficiently under all atmospheric conditions without maintenance. In many plants GRID installations have been operating continuously for 16 years without maintenance cost. Install unit heaters that will last as long as the pipes furnishing steam to them.



★ One piece construction heating sections (patented) of high test cast iron that withstand steam pressures up to 250 lbs.

★ No soldered, brazed, welded or expanded connections to become loose or develop leaks.

★ No electrolysis to cause corrosion, breakdowns, leaks, or heating failures.

SEND for booklet "Corrosion in Unit Heaters"—free upon request.

D. J. MURRAY MANUFACTURING CO. WAUSAU WISCONSIN

STOKER ENGINEERING *at its best!*

Your CUSTOMER wants a stoker that provides the greatest amount of comfort and convenience with the best economy. You want to sell a stoker that will deliver these factors for the most years with the least amount of service. Customer satisfaction creates sales . . . reduced service costs increase profits.

GEHL STOKERS

In Gehl Stokers you get engineering that has met the test over a period of many years . . . stokers built to do a better job for more years, by a 79-year-old company. You get friendly, experienced cooperation based on a long-time knowledge of stoker merchandising.

Among the many features that make Gehl Stokers outstanding are: Heavy, all-cast, rust-resisting chassis . . . Barometric automatic control of chimney draft . . . Unit air and coal feed tube that insures even distribution of air in the fire bed . . . An auto-type transmission . . . A retort that assures efficient combustion.

Domestic and Industrial models now available

WRITE today for literature and details of the Gehl dealer program.

ESTABLISHED 1867
GEHL BROS. MFG. CO.
Dept. BM-832 WEST BEND, WIS.

A GEHL WINS FRIENDS WHEREVER IT GOES

QUALITY **MARTOCELLO** Products are fully **DEPENDABLE**

ATOMIZING SPRAY NOZZLES, SPRAY POND NOZZLES, and CONDENSER WATER DISTRIBUTORS
For Vertical Shell and Tube Ammonia Condensers

ALL MARTOCELLO SPRAY NOZZLES are manufactured with precision and of a design which has been thoroughly tested for maximum results and durability. They are guaranteed to give satisfaction. Successful, efficient results depend largely upon selecting the proper number, type and size of Nozzles suitable for your installation.
THE MARTOCELLO CONDENSER WATER DISTRIBUTORS are now used as standard equipment by Progressive Refrigerating Engineers in solving their Manpower problem, because they require no attention and assure users of the lowest Condenser Operating Pressures and Minimum Power Cost.
It will pay you to consult us. WRITE or WIRE for further information.

Jos. A. Martocello & Co. 229-231 NORTH 13th STREET PHILADELPHIA 7, PA.
"Serving the Ice Industry Since 1916" "There is no Substitute for MARTOCELLO QUALITY"

GOT A WATER SCALE PROBLEM?

Solve it with . . .

SOL-VET "08"

● **SOL-VET "08"** is a fast, efficient cleaner of all equipment using water for cooling. By dissolving impurities *completely* they are carried out *in solution*, and clogging is eliminated. Head pressures fall to normal; heat transfer is raised to maximum; full circulation is restored; life of equipment prolonged. On large jobs, shutdown time is cut to a maximum of 6 to 8 hours.

GUARANTEED EFFECTIVE If you find SOL-VET "08" is not exactly as represented, when used according to instructions and full, accurate report is given within 30 days from date of purchase, your money will be *refunded in full.*

GUARANTEED HARMLESS when used as directed to all water conducting materials used in water cooled equipment.

WRITE TODAY for complete data and analysis and recommendations for your specific problems.

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ARMSTRONG BROS.
BETTER PIPE TOOLS
"ARMSTRONG BROS." Pipe Vises are built for lifetime service with *unbreakable* drop forged steel hooks. Other design improvements include: oval handle ends (will not pinch hands), replaceable tool steel jaws with milled teeth, and on sizes 70 and 71, a solid 1-piece jaw that prevents kinking of small pipe. There are always extra quality features in an "ARMSTRONG BROS." Pipe Tool.
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Eastern Whse. and Sales: 199 Lafayette St., New York 12, N. Y.
Pacific Whse. and Sales Office: 1275 Mission St., San Francisco 3, Calif.

grams, charts, and photographs, together with information on the use of graphs for determining the required performance of a radiant panel heating system under control.

Data Sheets on Gas Combustion

No. 6351—The first 10 of a series of "Combustioneering" data sheets, prepared for gas combustion and process engineers, are offered by the Bryant Heater Co., Industrial Div., 1020 London Rd., Cleveland 10, Ohio. Mathematical tables, properties of gases, metals, and other materials, and gas orifice capacity tables are included in these initial sheets.

"Freon" Water Coolers

No. 6352—An improved, dry expansion "Freon" water cooler, in which the refrigerant is evaporated in the tubes and water is circulated in the shell, is covered in a 12 page booklet issued by The Patterson-Kelley Co., Inc., East Stroudsburg, Pa. Construction details and selection data are included.

Gaskets

No. 6353—United States Gasket Co., P. O. Box 93, Camden, N. J., has issued a 28 page bulletin covering the company's line of gaskets including "Ajax" spiral wound metal, API and ASA ring joint, corrugated metal and double jacketed corrugated, together with "Ugasco" metal spiral wound gaskets and compressed asbestos sheet packing. Other types which are included consist of profile and serrated, metal-asbestos, plain solid metal, asbestos cloth-wire inserted, rubber, fiber, and cork gaskets, together with special types for applications such as heat exchangers and cylinder heads.

Germicidal Protection and Disinfection by Ultraviolet Light

No. 6354—Germicidal Protection and Disinfection of Liquids and Surfaces of Solids is the title of a 24 page booklet (LD-14) prepared by L. J. Buttolph and published by General Electric Co., Lamp Dept., Nela Park, Cleveland 12, Ohio. The booklet contains information on the application of germicidal lamp energy to reduce contamination of many products susceptible to spoilage by bacteria and molds. Among the many items discussed are the treatment of containers, refrigerators, various foods and beverages, air ducts, surfaces and room air. Quantities of the bulletin may be purchased at the cost of publication.

Heating Boilers and Accessories

No. 6355—Catalog No. 80, released by Burnham Boiler Corp., Irvington, N. Y., includes descriptions and illustrations covering the features, dimensions and ratings of both jacketed and unjacketed, cast iron sectional heating boilers for all fuels, sectional coal-burning boilers in the smokeless series, and welded steel low pressure boilers. In addition to various other and smaller boilers, the booklet describes the company's "Base-Ray" radiant heating baseboard, radiators, and heating specialties.

SEE THE NEW

Johnson

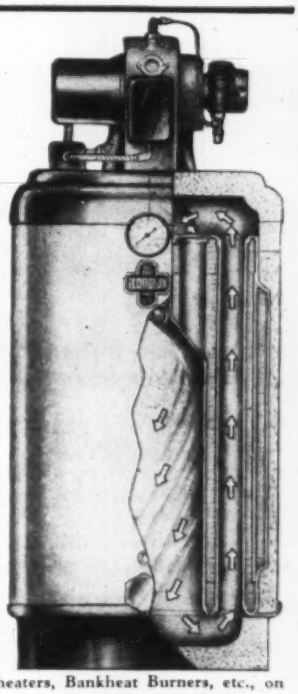
ECONOLUX

IN *Action*

AT THE

CLEVELAND EXPOSITION

Jan. 27-31

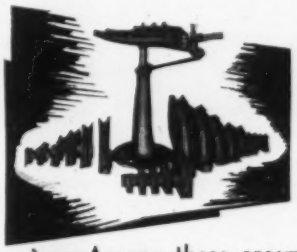


It's well worth seeing! . . . Though it's only 24" x 60" in size, this amazing new Econolux furnishes ample heat and faucet hotwater for 8 to 10 room homes. For owner and installer alike . . . it offers a happy solution to many domestic heating problems. Be sure to see it at the Johnson Booth. There'll be some of those famous Johnson heavy-duty burners, water heaters, Bankheat Burners, etc., on exhibit too. If you go to Cleveland . . . make it a point to visit the Johnson burner booth.

....Johnson Oil Burners...

S. T. JOHNSON CO.
940 Arlington Ave., Oakland 8, Calif.
401 No. Broad St., Philadelphia 8, Pa.

RADIANT HEAT PIPE BENDING is EASY, FAST with "*American*" MACHINES



Hand powered, the A-30 bends ⅛ to 2" standard pipe sizes at a radius of 5 to 1, up to 180°. Special radii can be supplied within these sizes.

Extra fast! — average bend made in 60 seconds! Versatile! — bends cold pipe, conduit and tube, copper and brass I.P.S. without crimping. Our world-wide customers include the United States Government, 9 foreign governments, and over 12,000 of the world's largest industrial plants.

Among these are:

CRANE CO.
STATE OF VIRGINIA
E. I. DU PONT
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NEW ENGLAND RADIANT HEATING COMPANY
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"*American*" PIPE BENDING MACHINE *Company* INC.

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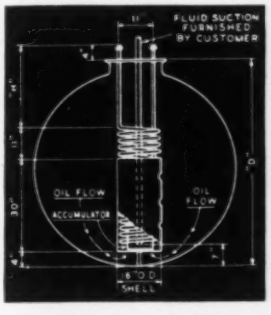
MAKING HEAVY OILS IN BULK STORAGE FLOW FREELY!

REMPE

"Hot Spot" Preheater

Oil and other heavy bodied fluids flow more freely at high temperatures. The Rempe "Hot Spot" preheats such liquids in bulk storage. Preheating is assured by exclusive flow accumulator—liquids flow over heating coils before entering the suction line.

Illustration at right shows how this preheater is installed in a bulk storage tank. Heating and suction pipes pass through the manhole cover.



All-steel construction. Tested after fabrication. Inlet and outlet pipes furnished in required lengths for any diameter tank-connections for use with hot water or steam.

Wire—Write for complete details.

REMPE COMPANY

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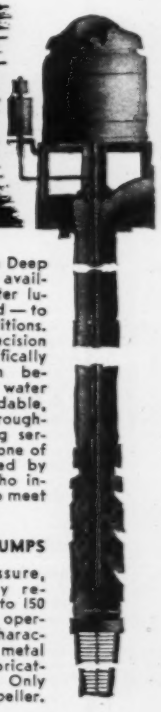
Manufacturers & Designers of heat transfer equipment.

Where *Streamlining* Pays Dividends

DEEP WELL TURBINE PUMPS *"by Aurora"*



Sizes 4" to 24"

AURORA CENTRIFUGALS
for Every Pumping Job
HORIZONTAL SPLIT CASE
Single & Two Stage
SIDE SUCTION
VERTICAL NON CLOG SUMP
MIXED FLOW
SPECIAL DESIGN
Write for
CONDENSED CATALOG "M"
or
Consult SWEETS

These outstanding Aurora Deep Well Turbine Pumps are available in both oil and water lubricated units as desired — to meet all operating conditions. Their sturdiness and precision manufacture plus scientifically streamlined coordination between impellers and water channels insures dependable, low cost water supply throughout an exceptionally long service life. Their record is one of high merit — as evidenced by the many Aurora users who install additional Auroras to meet expansion requirements.

APCO TURBINE-TYPE PUMPS

For high pressure, small capacity requirements (up to 150 g.p.m.). Wide operating range characteristics. No metal to metal contact. Handles non-lubricating liquids without wear. Only one moving part—the Impeller.

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AURORA *Always* PUMPS

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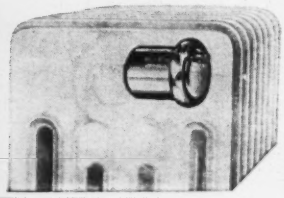
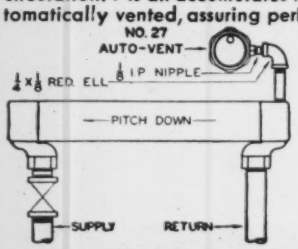
NO MORE AIR-BOUND RADIATORS



WITH THE *NEW* AUTO-VENT AIR ELIMINATOR

Install the No. 27 Auto-Vent Air Eliminator on all hot water radiators and convectors and release that invisible Air Brake that retards circulation. As air accumulates in the radiators or pipe lines it is automatically vented, assuring perfect circulation throughout the system at all times. You get more even heat and use less fuel.



No. 27 AUTO-VENT INSTALLED ON CONVECTOR RADIATOR

No. 27 can be installed on convectors, baseboard radiation panels, radiant heating coils, etc., without the use of an air chamber. For pressures up to 50 lbs.

Ask your jobber

PLAY SAFE—USE THEM ON EVERY JOB

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3215 NORTH PULASKI ROAD
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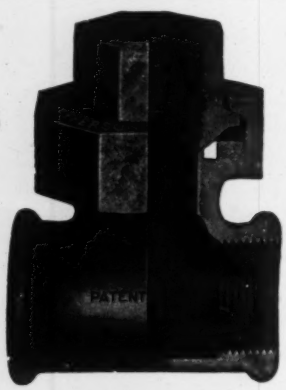
AUTOMATIC HUMIDIFIERS
ALL TYPES
ALL SYSTEMS

THE UNIONS WITH THE RECESSED BRASS SEAT



JEFFERSON SPECIALTY UNIONS

Effect Big Savings in Labor

Jefferson Union Tees with union on the outlet assure labor savings and better piping jobs because they take the place of an all-female union, two nipples and an ordinary tee. Three joints are thus saved. Aavilable in All-Female and Male and Female threads.

The brass seating in these and all Jefferson Specialty Unions is an exclusive feature which, located in a recess away from the runway of the fitting, leaves a straight bore assuring unrestricted flow in the pipe.

JEFFERSON UNION CO.

601 West 26th Street, New York 1, N. Y.

Factories at

Lexington 73, Mass. **Lockport, N. Y.**

Indicating and Recording Thermometers and Pressure Gages

No. 6356—Rectangular case thermometers and pressure gages of both the indicating and recording type are illustrated and described in catalog No. 67[illegible] released by the Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., 4534 Wayne Ave., Philadelphia 44, Pa. Vapor, gas, and mercury actuated instruments are covered and bulbs, charts and interchangeable cases also described.

Insulation for Industrial Heat and Power Applications

No. 6357—A 19 page booklet, prepared by the Industrial Mineral Wool Institute, 441 Lexington Ave., New York 17, N. Y., features nine hypothetical examples or case studies to demonstrate the fuel savings which may be effected by insulating boiler shells, settings, and drum heads, feedwater heaters, ducts, piping, flanged joints, storage tanks, and driers.

Integral Dust Collector

No. 6358—The Aerotec Co., White Plains, N. Y., has issued a new catalog (No. 310) illustrating and describing the company's integral dust collector for grinding and buffing applications. Capacities, dimensions, performance data, and tabulated recommendations as to hood sizes, air quantities, and the minimum hood static resistance are included.

Pipe Coils

No. 6359—Pipe coils built to specifications and of continuous welded pipe of any metal, size, and design are described in the Vol. 1, No. 4 monthly news letter published by Doyle & Roth Mfg. Co., foot of Hawkins St. at Central R. R. of N. J., Newark 5, N. J.

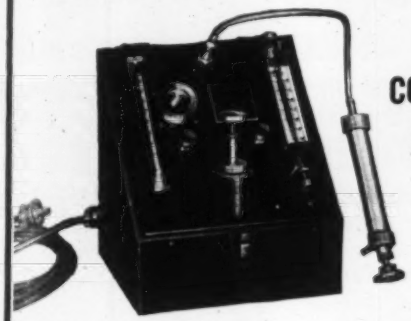
Pneumatic Control Valves and Controller Accessories

No. 6360—Bulletin No. 277-1, a 36 page publication of the Foxboro Co., 106 Neponset Ave., Foxboro, Mass., covers the company's line of pneumatic control valves and controller accessories. Specifications for control, needle, poppet, and butterfly valves are featured. Data are included on air switches and subpanels for remote control as well as on the vernier "Valvactor" for accurate positioning of valve plungers. A color page shows the various identifying enamel finishes offered on "Stabilflo" valves, corresponding to the ASA color code.

Pressure Reducing Valves

No. 6361—Engineering, operating, and maintenance data on pressure reducing, pressure differential, and pressure overflow valves for steam, air, or gas service are contained in Bulletin 461 issued by the Leslie Co., 51 Delafield Ave., Lyndhurst, N. J. Pressure ranges, sizes, capacities, and construction details are included, and recommended installations are shown and discussed for remotely adjusted valves, valves with internal ports, and valves designed for external control.

SIMPLE DEW POINT INDICATIONS



consistently accurate

The new Alnor Dew Point Indicator is easy to use, and because indications take place in an enclosed observation chamber under controlled conditions, the end point may be accurately observed. Errors due to the human element are reduced, and two or more operators will obtain consistently accurate results. The Alnor Dew Point Indicator is complete and self-contained, without external cooling or auxiliaries. The instrument is readily portable, and is operated by either AC or battery power. Its value has been proved in many plants in connection with controlled atmosphere furnaces, with compressed gases and gas fuels, in chemical processes, refrigeration, and similar work. Write for Bulletin 4017.

ILLINOIS TESTING LABORATORIES, INC.

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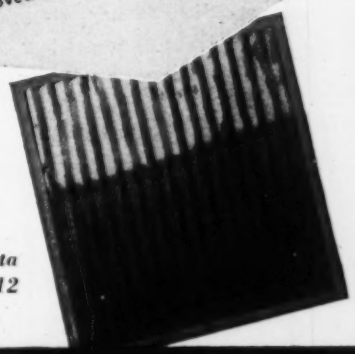
NEW TURCO METHOD

CLEANS AIR FILTERS IN 15 MINUTES!

STOPS FIRE HAZARD—NO ODOR
NON-INJURIOUS TO METAL

With Turco's new method of cleaning air filters, no special equipment or skilled help is needed. A solution of Turco Aktiv is used in a cold tank. The loosened dirt and grease are easily flushed away with cold water hosing. Filter is dried in stream of air. The Turco Aktiv method has been tested and approved by leading air filter manufacturer.



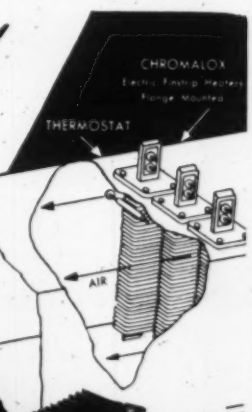
For complete data Write Dept. HPA-12

TURCO

TURCO PRODUCTS, INC. Main Office and Factory: 6135 S. Central Ave., Los Angeles 1. Offices and Factories: 1606 Henderson St., Houston 10, Tex.; 125 W. 46th St., Chicago 9. Offices and Warehouses: All Principal Cities

AUXILIARY Electric HEAT

For PLANTS, OFFICES and STORES



CHROMALOX FINSTRIP HEATERS

EASY TO INSTALL
Air-duct application using CHROMALOX Finstrip Heaters

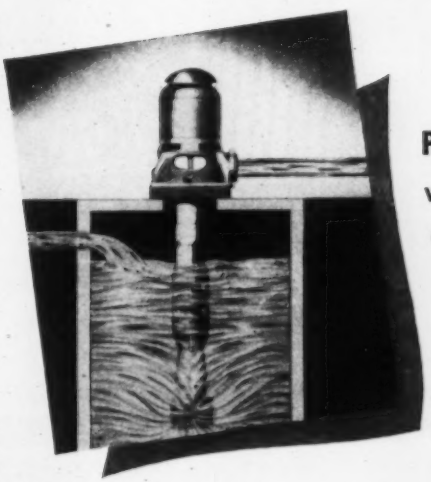
These rugged CHROMALOX Electric Finstrip Heaters will meet your demands for a fast and reliable heat-source. Heat is quickly dissipated by CHROMALOX Finstrips which are mounted in the ducts. Operating temperatures are accurately controlled by CHROMALOX Thermostats.

Save time and money, reduce maintenance with CHROMALOX Electric Heaters. For details, request Catalog 42 showing full line of easily installed heating units and the booklet "100 Ways to Apply Electric Heat."

EDWIN L. WIEGAND CO., 7610 THOMAS BOULEVARD, PITTSBURGH 8, PA.

CHROMALOX SB-8

ELECTRIC HEATING AT ITS BEST!



PEERLESS VERTICAL, CLOSE-COUPLED TURBINE PUMPS

PEERLESS PUMPS

FULL TURBINE PUMP UTILITY & CAPACITY

from Short or Medium Settings

Peerless Vertical, Close-Coupled Turbine Pumps offer a most efficient method of supplying and moving water from short settings. Ideal for installation over sumps, pits, basins, etc., where turbine pump utility and capacity are required. Capacities: From 15 to 30,000 G.P.M. For medium and high heads. • Oil or water lubrication. • Choice of Drives.

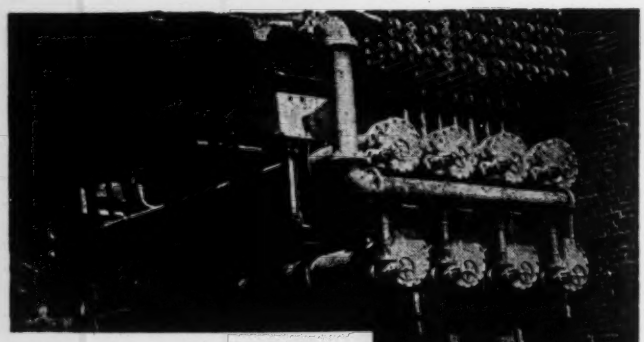
Request Bulletin B-159, describing the engineering, construction and application of Peerless Vertical Close-Coupled Turbine Pumps.

PEERLESS PUMP DIVISION

FOOD MACHINERY CORPORATION

Canton 6, Ohio • Quincy, Illinois • Los Angeles 31, Calif.

Distributors in all Principal Cities



Conseco ammonia heat exchanger Installation, Stanley Theatre, Philadelphia.

CONSECO

Twenty years' specialized experience designing, fabricating and servicing heat exchangers assure sound design, quality construction and economical operation with any type refrigerant. Engineering assistance gladly furnished. Write.

HEAT EXCHANGERS for Air Conditioning

SERVICE

CONDENSER SERVICE & ENGINEERING CO., INC.

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Auer Grilles
Auer makes many grille designs in stamped metals for all purposes. Furnished in sizes, materials, and finishes to fit your requirements for air conditioning, ventilating, radiator enclosure, or concealment. To simplify your specification and detail work on grilles, use the Auer Grille Catalog "G". It gives complete grille dimension tables with actual size details. A copy will come to you on request.
THE AUER REGISTER CO.
3608 Payne Ave.,
Cleveland 14, Ohio
THE AUER REGISTER CO. · CLEVELAND, OHIO

Pulsation Dampener for the Flow of Gases

No. 6362—The Fluor Corp., Ltd., 2500 S. Atlantic Blvd., Los Angeles 22, Calif., has released Bulletin PD-1 which contains an article, The Effects and Corrections of Gas Pulsation Problems, by F. M. Stephens, principal research engineer of the company's development department. In addition to discussing the many different gas pulsation problems and some of the attempts made to correct them, the company's pulsation dampener is described in detail.

Radiant Baseboards

No. 6363—"Base-Ray" radiant baseboards are hollow cast iron units which are supplied with hot water or steam and are designed to provide radiant heat to rooms where they are installed in lieu of conventional baseboards. They are described and illustrated in a new four page booklet released by Burnham Boiler Corp., Irvington, N. Y.

Refrigeration Service Tools

No. 6364—An extensive line of tools for the refrigeration service man is described and illustrated in a new 19 page catalog (No. 46R) released by Bonney Forge & Tool Wks., Allentown, Pa., In addition to various types of hammers, chisels, files, hack saws, and punches, the line includes many sizes of box wrenches and sets of socket wrenches, together with special refrigeration tools such as tube benders and cutter-flare nut wrenches, and socket wrenches for packing gland nut sockets and valve stem sockets.

Remote Indicating and Control Systems

No. 6365—Bulletin 14B6641, issued by Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. describes the function, operation, and construction of the company's remote indicating and control systems. Although basically a direct current device, the system can be operated on a-c current by the addition of a small rectifier unit, and it is said to be suitable for a variety of remote control applications utilizing valves, rheostats, potentiometers, governors, switching devices and combination sequence controls, as well as remote indicating systems and remote signaling.

Sewage Pumps for General Service and Special Liquors

No. 6366—Buffalo Pumps, Inc., 171 Mortimer St., Buffalo 5, N. Y., has issued a new 32-page data book (Bulletin 964-D) giving construction details, dimensions, and installation and operating data on the company's line of vertical, horizontal, and self-priming sewage pumps, sewage ejectors, and single suction sludge pumps for general service and special liquors.

Strip Chart Potentiometers

No. 6367—The "Electronik" strip chart potentiometer is the subject of catalog No. 15-10, recently issued by the Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., 4534 Wayne Ave., Philadelphia 44, Pa. The operating principle of the

REZNOR
THE AUTOMATIC GAS HEATER *with the*···
Big! Quiet!
FAN

Reznor space heaters located at ceiling height or floor level and **fired by gas**, operate with automatic control. The big fan plus directional louvres direct abundance of warm air **where** you want it and only **when** you want it. Commercial establishments and buildings of all types, factories and warehouses, offices and homes use these attractive Reznor heaters for comfort, cleanliness, and economy.

Write for further data.

REZNOR
Gas fired unit heaters

SUSPENDED OR FLOOR MODEL
A SIZE FOR EVERY NEED

REZNOR CO.
MERCER, PENNA.
GAS HEATERS SINCE 1888

NO BOILERS • NO STEAM LINES
NO FUEL STORAGE • NO FIRE TENDING

Get *Extra Profits* out of Radiant Heating by bending pipe on the job with Tal's Portable, Hydraulic Bender

• Bending pipe on the job is making **more money** for those contractors alert enough to get behind radiant heating with the right equipment—a Tal portable pipe bender. This best engineered machine bends cold to any angle all wrought iron or steel pipe 3/8" to 3" in one single, fast moving operation. It reduces the need for welds by from 40% to 80% — speeds up installation work. Used now by leaders who know it repays its low cost many times a year. Write for bulletin

Tal's Prestal Bender, Inc.
Dept. HPA-12 **Milwaukee 2, Wis.**

ENGINEERED to fit..
FORGED FLARE NUTS AND FITTINGS
Prompt Shipment on most items
Electrimatic
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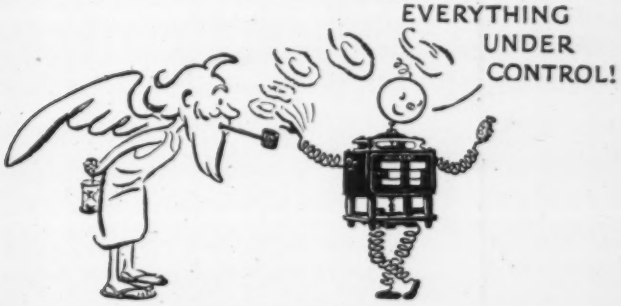

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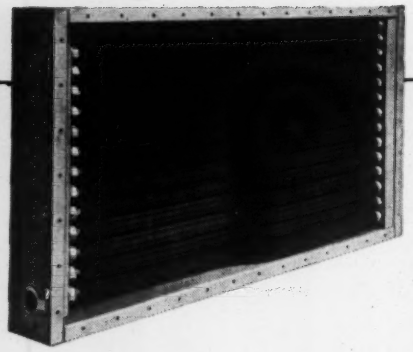

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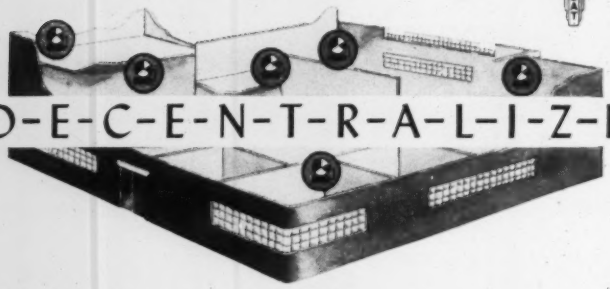

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"continuous balance" and the construction details are described and illustrated. Also included are illustrated descriptions of standard speed, fast speed, and high speed potentiometers, auxiliary switch forms, the potentiometer controller, precision indicator, and thermocouple assemblies.

Stud Welding

No. 6368—The Nelson Specialty Welding Equipment Corp., 440 Peralta Ave., San Leandro, Calif., has issued a number of descriptive folders covering the company's production and manual types of stud welding units together with the extensive line of special studs for numerous applications which are described and illustrated. These include securing inspection and manhole covers, pipe or conduit hangers, and various types of insulation. Other applications described include the welding of stay bolt studs in boiler fabrication, and the welding of boiler tube studs.

Unit Heaters

No. 6369—Announcement of the new line of unit heaters, developed by Modine Mfg. Co., Racine, Wis., is contained in the Vol. 9, No. 11 issue of the company house organ. Designed for use with steam or hot water, the line includes heaters for horizontal, vertical, or power throw delivery.

Water Coolers

No. 6370—The Vol. 1, No. 5 news letter released by Doyle & Roth Mfg. Co., foot of Hawkins St. at Central R. R. of N. J., Newark 5, N. J., briefly describes and illustrates U tube water coolers for industrial, commercial and chemical use in sizes of five tons and up. Shell and tube water coolers (5 tons and up) are covered in the Vol. 1, No. 6 issue of the company's news letter. Both coolers have copper tubes and steel shells, flanges, tube sheets, and baffles.

Water Treatment Data Sheets

No. 6371—A series of data sheets, designed to show how organic-colloidal treatment and inorganic-chemical methods apply to the various phases of water treatment, have been published by American K.A.T. Corp., 331 Madison Ave., New York 17, N. Y.

Welded Alloy Tubing

No. 6372—Stainless steel, nickel, monel, and inconel tubing from ⅛ to 18 in. in diameter are described and illustrated in a 16 page bulletin released by the Trent Tube Mfg. Co., East Troy, Wis. In addition to a description of various applications and fabricating procedures, theoretical weights and bursting pressures of stainless steel tubes and other technical data are included.

Welded Steel Boiler

No. 6373—Kewanee Boiler Corp., Kewanee, Ill., has issued catalog 89A containing specifications and dimensions as well as a description of the "Hi-Test" welded, two pass, series HT steel boiler. Rated at 125 and 150 lb steam pressure and offered in six sizes from 50 to 150 hp, this fusion-welded boiler is designed for all fuels.

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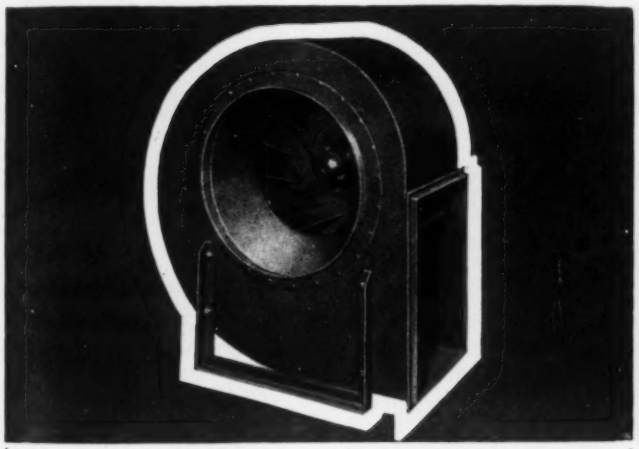

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In all sizes, wheels 12 to 72 in.

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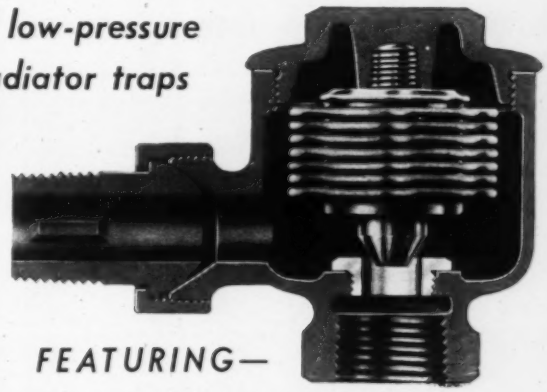

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Other features of these new-type radiator traps for vapor and vacuum steam heat: larger valve orifice, increased drainage; valve, wide open when cold, closes at once when steam enters; special bronze bellows. 2 types, for 200 and 400 sq. ft. EDR; pressures to 25 lbs. Competitively priced.

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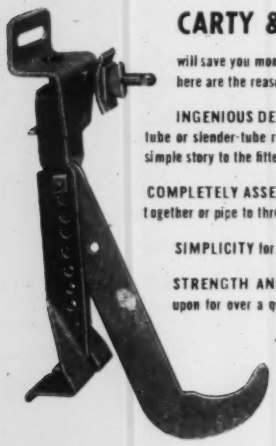

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Welding Electrodes and Gas Welding Rods

No. 6374—A 64 page catalog covering electrodes and oxyacetylene gas welding rods has been released by the Hollup Corp., Div. of National Cylinder Gas Co., 4700 W. 19th St., Chicago 50, Ill. Included are descriptions, color identifications, specifications, physical properties, welding procedures, recommended ranges, and sizes available in the company's line of electrodes.

Welding Fittings for Branch Pipe Outlets

No. 6375—Bonney Forge & Tool Wks., 350 Green St., Allentown, Pa., has issued a 20-page catalog containing application data, structural features, installation procedure, temperature-pressure rating charts, specifications, and list prices on "WeldOlet" fittings which are designed for making right angle, branch pipe outlets.

Welding Rod for Monel Metal

No. 6376—The use of "Eutec Rod 20" in the fabrication of a leakproof and air tight monel piping system in the atomic bomb plant at Oak Ridge, Tenn., is described in the Vol. 3 No. 11 issue of the house organ published by the Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y. The major requirements for this system consisted of holding leakage to an absolute minimum and maintaining a high degree of purity inside the piping.

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HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT

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INDUSTRIAL, COMMERCIAL, INSTITUTIONAL AND PUBLIC BUILDINGS

PART 1—PRODUCTS CLASSIFIED—Page 266

If you want to know the names of one or more manufacturers making a certain product, look in Part 1, where products are classified alphabetically in "directory style" with the noun governing (for instance, "unit heaters" are listed under "heaters, unit").

PART 2—TRADE NAMES—Page 336

If you have the trade name of a product and want to know who manufactures it, look in Part 2, where trade names are alphabetically listed. Trade names the same as or identifiable from the company name are not listed. Manufacturers with such trade names can be easily identified under their product classification in Part 1.

PART 3—MANUFACTURERS' ADDRESSES—Page 351

For the complete name and address of any manufacturer look in Part 3.

● The manufacturers whose names are spotted throughout the listings advertise in this issue. See Index to Advertisers (on page 367) for the page on which you will find the advertising of any of these manufacturers.

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PART 1—PRODUCTS CLASSIFIED

ABSORBERS, VIBRATION

See Hose, Metal and Fittings; Bases and Pads, Vibration Isolating

ABSORBERS, VIBRATION, FOR REFRIGERANT LINES

American Metal Hose Branch, American Brass Co., Waterbury, Conn.
Atlantic Metal Hose Co., Inc., New York, N. Y.
Bendix Aviation Corp., Philadelphia Div., Philadelphia, Pa.
Chicago Metal Hose Corp., Maywood, Ill.
Packless Metal Products Corp., New Rochelle, N. Y.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Seamlex Co., Inc., Long Island City, N. Y.
Titeflex, Inc., Newark, N. J.
United Metal Hose Co., Inc., Long Island City, N. Y.
Zallea Brothers & Johnson, Wilmington, Del.

ABSORPTION DEHUMIDIFIERS

See Dehumidifiers, Absorption and Adsorption

ABSORPTION REFRIGERATION MACHINES

See Machines, Refrigeration, Absorption

ACCUMULATORS, REFRIGERATION (FOR AIR CONDITIONING)

● Acme Industries, Inc., Jackson, Mich.
American Injector Co., Detroit, Mich.
Frick Co., Waynesboro, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
● McQuay, Inc., Minneapolis, Minn.
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Temprite Products Corp., Detroit, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.

ADJUSTABLE WRENCHES

See Wrenches, Adjustable

ADSORBERS, ODOR

Betz Corp., Hammond, Ind.
Carbide and Carbon Chemicals Corp., New York, N. Y.
● Connor Engineering Corp., W. B., New York, N. Y.
Refinite Corp., Omaha, Neb.

ADSORPTION DEHUMIDIFIERS

See Dehumidifiers, Absorption and Adsorption

AFTERCOOLERS, COMPRESSED AIR

Adams Co., Inc., R. P., Buffalo, N. Y.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Locomotive Co., Alco Products Div., New York, N. Y.
Andale Co., Philadelphia, Pa.
● Bethlehem Steel Co., Bethlehem, Pa.
Blackburn-Smith Mfg. Co., River St., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Downingtown Iron Works, Downingtown, Pa.
Howard Iron Works & Alberger Heater Co., Buffalo, N. Y.
Ingersoll-Rand Co., New York, N. Y.
● Johnson Corp., Three Rivers, Mich.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
Parks-Cramer Co., Fitchburg, Mass.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Ruemelin Mfg. Co., Milwaukee, Wis.
Schutte & Koerting Co., Philadelphia, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Struthers Wells Corp., Titusville, Pa.
Tippett & Wood, Phillipsburg, N. J.
Worthington Pump & Machinery Corp., Harrison, N. J.
● Young Radiator Co., Racine, Wis.
Zallea Brothers & Johnson, Wilmington, Del.

AIR AFTERCOOLERS

See Aftercoolers, Compressed Air

AIR BREAK FITTINGS

See Fittings, Drainage, Fixed Air Break

AIR CLEANERS

See Cleaners, Air, Electrical

AIR COMPRESSORS

See Compressors, Air

AIR CONDITIONERS

See Units, Air Conditioning

AIR CONDITIONING UNITS

See Units, Air Conditioning

AIR DIFFUSERS

See Diffusers, Air, High Velocity; Grilles; Panels, Perforated for Air Diffusion; Registers

AIR DIFFUSION

See Panels, Perforated, for Air Diffusion

AIR ELIMINATORS

See Eliminators, Air

AIR FILTER CLEANING COMPOUNDS

See Compounds, Cleaning, Air Filter

AIR FILTER GAGES

See Gages, Air Filter

AIR FILTERS

See Filters, Air

AIR FRESHENING

See Compounds, Air Freshening; Adsorbers, Odor

AIR RECOVERY EQUIPMENT

See Adsorbers, Odor

AIR SEPARATORS

See Separators, Air

AIR VALVES

See Valves, Radiator, Air

AIR VELOCITY METERS

See Meters, Air Velocity, Direct Reading; Anemometers

AIR VOLUME METERS

See Meters, Volume, Air and Gas

AIR WASHERS

See Washers, Air

ALARMS, HIGH AND LOW BOILER WATER

Combustion Control Corp., Cambridge, Mass.
Eclipse Fuel Engineering Co., Rockford, Ill.
● Illinois Engineering Co., Chicago, Ill.
● Johnson Corp., Three Rivers, Mich.
● Kieley & Mueller, Inc., North Bergen, N. J.
● McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
Reliance Gauge Column Co., Cleveland, O.
● Schaub Engineering Co., Fred H., Chicago, Ill.
Wright-Austin Co., Detroit, Mich.
● Yarnall-Waring Co., Philadelphia, Pa.

ALARMS, SMOKE

American District Telegraph Co., New York, N. Y.
● Autempco Corp., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Instrument Engineering Associates, Brooklyn, N. Y.
● Leeds & Northrop Co., Philadelphia, Pa.
Photoswitch, Inc., Cambridge, Mass.
● Power Engineering Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Worner Products Corp., Chicago, Ill.

ALGAE CONTROL, WATER TREATMENT FOR SLIME AND

See Treatment, Water, for Slime and Algae Control

ALUMINUM COATED SHEETS

See Sheets, Aluminum Coated

ALUMINUM PIPE

See Pipe, Aluminum

● Advertisement in this issue. See Index to Advertisers, pages 367-368.

ALUMINUM SHEETS
See Sheets, Aluminum

ANALYZERS, CARBON DIOXIDE, PORTABLE
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Barclay, Inc., Robert, Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Eimer & Amend, New York, N. Y.
Ellison Draft Gage Co., Chicago, Ill.
Engelhard, Inc., Chas., Newark, N. J.
Ess Specialty Corp., Bergenfield, N. J.
General Scientific Equipment Co., Philadelphia, Pa.
• Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Precision Control Co., San Francisco, Calif.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Service to Industry, West Hartford, Conn.
Uehling Instrument Co., Paterson, N. J.
Weaver Mfg. Co., Springfield, Ill.

ANEMOMETERS
American Instrument Co., Silver Spring, Md.
Barclay, Inc., Robert, Chicago, Ill.
Detroit Air Conditioning Service Co., Inc., Detroit, Mich.
Eimer & Amend, New York, N. Y.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Hill, E. Vernon, Chicago, Ill.
• Illinois Testing Laboratories, Inc., Chicago, Ill.
• Taylor Instrument Companies, Rochester, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.
Willson Products, Inc., Reading, Pa. (Thermometer type)

ANGLE VALVES
See Valves, Angle

ANGLES, BARS, BEAMS, CHANNELS AND TEES (LIGHT WEIGHT SHAPES)
Allegheny Ludlum Steel Corp., Brackenridge, Pa.
• Aluminum Co. of America, Pittsburgh, Pa.
• American Brass Co., Waterbury, Conn.
American Sheet Metal Works, New Orleans, La.
Atlantic Steel Co., Atlanta, Ga.
• Bethlehem Steel Co., Bethlehem, Pa.
Brasco Mfg. Co., Harvey, Ill.
Byers Co., A. M., Pittsburgh, Pa.
Carnegie-Illinois Steel Co., Pittsburgh, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Colonial Alloys Co., Metals Div., Philadelphia, Pa. (Stainless)
Columbia Steel Co., San Francisco, Calif.
Decatur Iron & Steel Co., Decatur, Ala.
Dow Chemical Co., The, Midland, Mich.
Downs-Smith Brass & Copper Co., New York, N. Y.
Inland Steel Co., Chicago, Ill.
International Steel Co., Evansville, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
Lees, John, Div., Serrick Corp., Muncie, Ind.
Mesker & Co., Geo. L., Evansville, Ind.
Milcor Steel Co., Milwaukee, Wis.
Penn Galvanizing Co., Philadelphia, Pa.
Republic Steel Corp., Cleveland, O.
• Revere Copper and Brass, Incorporated, New York, N. Y.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Truscon Steel Co., Youngstown, O.
• Weirton Steel Co., Weirton, W. Va.
• Youngstown Sheet & Tube Co., Youngstown, O.

AQUASTATS
See Thermostats

ARC WELDERS
See Welders, Arc

ARC WELDING ELECTRODES
See Electrodes, Arc Welding

ASBESTOS FIBER AND CEMENT PIPE
See Pipe, Asbestos Fiber and Cement

ASBESTOS PACKING
See Packing, Asbestos

ASH CONVEYORS
See Conveyors, Coal and Ash

ATOMIZING NOZZLES
See Nozzles, Atomizing

AXIAL FLOW FANS
See Fans, Axial Flow, Pressure Type

BALANCING ELBOWS FOR HOT WATER HEATING SYSTEMS
See Elbows, Balancing, for Hot Water Heating Systems

BALANCING EQUIPMENT
See Equipment, Balancing

BALANCING VALVES
See Valves, Balancing

BALL BEARINGS
See Bearings, Ball

BAROMETRIC CONTROLS
See Controls, Draft, Barometric

BASEBOARD, RADIATION, FERROUS
See Radiation, Baseboard, Ferrous

BASES, MOTOR, TENSION ADJUSTING
Ackermann Mfg. Co., Wheeling, W. Va.
Alexander Bros., Philadelphia, Pa.
• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Browning Mfg. Co., Inc., Maysville, Ky.
General Electric Co., Schenectady, N. Y.
Maysteel Products, Inc., Milwaukee, Wis.
Remco Products Corp., York, Pa.
• Rhoads & Sons, J. E., Philadelphia, Pa.
Rockwood Mfg. Co., Indianapolis, Ind.

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Armstrong Cork Co., Lancaster, Pa.
• Buffalo Forge Co., Buffalo, N. Y.
• Clarage Fan Co., Kalamazoo, Mich.
Cork Import Corp., New York, N. Y.
Cork Insulation Co., Inc., New York, N. Y.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felters Co., Inc., Boston, Mass.
Firestone Tire & Rubber Co., Akron, O.
Gates Rubber Co., Denver, Colo.
Goodrich Co., B. F., Akron, O.
Johns-Manville, New York, N. Y.
Keldur Corp., New York, N. Y.
Korfund Co., Inc., Long Island City, N. Y.
• Lord Mfg. Co., Erie, Pa.
• M B Mfg. Co., Inc., The, New Haven, Conn.
• Mundet Cork Corp., Brooklyn, N. Y.
National Lead Co., New York, N. Y.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Remco Products Corp., York, Pa.
Robinson Aviation, Inc., Teterboro Air Terminal, Teterboro, N. J.
Sponge Rubber Products Co., Shelton, Conn.
United Cork Companies, Lyndhurst, N. J.
United States Rubber Co., New York, N. Y.
Vibration Control Co., New York, N. Y.
Vibration Eliminator Co., Long Island City, N. Y.
Western Felt Works, Chicago, Ill.

BEARINGS, BALL
Ahlberg Bearing Co., Chicago, Ill.
Bantam Bearings Div., The Torrington Co., South Bend, Ind.
Bearings Co. of America, Lancaster, Pa.
Burgess-Norton Mfg. Co., Geneva, Ill.
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Link-Belt Co., Indianapolis, Ind.
Marlin-Rockwell Corp., Jamestown, N. Y.
New Departure Div., General Motors Corp., Bristol, Conn.
Nice Ball Bearing Co., Philadelphia, Pa.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Philadelphia, Pa.
Schatz Mfg. Co., The, Fairview, Poughkeepsie, N. Y.
Shafer Bearing Corp., Chicago, Ill.
• Stephens-Adamson Mfg. Co., Aurora, Ill.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, NEEDLE
Bantam Bearings Div., The Torrington Co., South Bend, Ind.

BEARINGS, PILLOW BLOCK
Ahlberg Bearing Co., Chicago, Ill.
Air Controls, Inc., Cleveland, O.
Caldwell Co., W. E., Louisville, Ky.
Central Die Casting & Mfg. Co., Inc., Chicago, Ill.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Freed Products Co., Moline, Ill.
General Motors Corp., Moraine Products Div., Dayton, O.
Goldens' Foundry & Machine Co., Columbus, Ga.
Hastings Air Conditioning Co., Hastings, Neb.
Jeffrey Mfg. Co., Columbus, O.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
• Lau Blower Co., Dayton, O.
Link-Belt Co., Indianapolis, Ind.
Medart Co., St. Louis, Mo.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
• Randall Graphite Products Corp., Chicago, Ill.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
SKF Industries, Inc., Philadelphia, Pa.
Shafer Bearing Corp., Chicago, Ill. (self aligning)
Sprout, Waldron & Co., Muncy, Pa.
Standard Pressed Steel Co., Jenkintown, Pa.
• Stephens-Adamson Mfg. Co., Aurora, Ill.
Triangle Mfg. Co., Oshkosh, Wis.
Viking Air Conditioning Corp., Cleveland, O.
Wood's Sons Co., T. B., Chambersburg, Pa.

• Advertisement in this issue. See Index to Advertisers, pages 367-368.

BEARINGS, ROLLER

Ahlberg Bearing Co., Chicago, Ill.
Bantam Bearings Div., The Torrington Co., South Bend, Ind
Dodge Mfg. Corp., Mishawaka, Ind.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Link-Belt Co., Indianapolis, Ind.
Medart Co., St. Louis, Mo.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Roller Bearing Co. of America, Trenton, N. J.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
SKF Industries, Inc., Philadelphia, Pa.
Shafer Bearing Corp., Chicago, Ill. (self aligning)
Timken Roller Bearing Co., Canton, O.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, SLEEVE

Dodge Mfg. Co., Mishawaka, Ind.
Federal-Mogul Corp., Detroit, Mich.
General Motors Corp., Moraine Products Div., Dayton, O.
Johnson Bronze Co., New Castle, Pa.
Keystone Carbon Co., Inc., St. Marys, Pa.
Medart Co., St. Louis, Mo.
Morganite Brush Co., Long Island City, N. Y.
Motex Metal Process Corp., Detroit, Mich.
• Randall Graphite Products Corp., Chicago, Ill.
Wood's Sons Co., T. B., Chambersburg, Pa.

BELLOWS, THERMOSTATIC AND METALLIC

• Bishop & Babcock Mfg. Co., Cleveland, O.
Bridgeport Thermostat Co., Inc., Bridgeport, Conn.
Cashin Co., W. D., Boston, Mass.
Chicago Metal Hose Corp., Maywood, Ill.
Clifford Mfg. Co., Boston, Mass.
• Cook Electric Co., Chicago, Ill.
Cryer Trap & Valve Co., Inc., New York, N. Y.
• Fulton Sylphon Co., Knoxville, Tenn.
Giannini Co., Inc., G. M., Pasadena, Calif.

BELTING, FLAT, LEATHER

Alexander Bros., Inc., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Chicago Belting Co., Chicago, Ill.
Graton & Knight Co., Worcester, Mass.
Houghton & Co., E. F., Philadelphia, Pa.
• Rhoads & Sons, J. E., Philadelphia, Pa.
Schieren Co., Chas. A., New York, N. Y.
Williams & Son, I. B., Dover, N. H.

BELTING, FLAT, RUBBER

Boston Woven Hose & Rubber Co., Boston, Mass.
Continental Rubber Wks., Erie, Pa.
Dick Co., Inc., R. & J., Passaic, N. J.
Firestone Tire & Rubber Co., Akron, O.
Garlock Packing Co., Palmyra, N. Y.
Gilmer Co., L. H., Div. of United States Rubber Co., Philadelphia, Pa.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hamilton Rubber Mfg. Co., Trenton, N. J.
Jeffrey Mfg. Co., Columbus, O.
Manhattan Rubber Mfg. Co., Div. of Raybestos-Manhattan, Inc., Passaic, N. J.
• Manheim Mfg. & Belting Co., Manheim, Pa.
Quaker Rubber Corp., Philadelphia, Pa.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Rockwood Mfg. Co., Indianapolis, Ind.
Thermoid Rubber, Div. of Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.

BELTS, V

• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Browning Mfg. Co., Inc., Maysville, Ky.
Chicago Belting Co., Chicago, Ill.
Continental Rubber Wks., Erie, Pa.
Dayton Rubber Mfg. Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Firestone Tire & Rubber Co., Akron, O.
Gates Rubber Co., Denver, Colo.
Gilmer Co., L. H., Div. of United States Rubber Co., Philadelphia, Pa.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Graton & Knight Co., Worcester, Mass.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Manhattan Rubber Mfg. Co., Div. of Raybestos-Manhattan, Inc., Passaic, N. J.
• Manheim Mfg. & Belting Co., Manheim, Pa.
Medart Co., St. Louis, Mo.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Rockwood Mfg. Co., Indianapolis, Ind.
Schieren Co., Chas. A., New York, N. Y.
Thermoid Rubber, Div. of Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

BENDERS, PIPE

• American Pipe Bending Machine Co., Inc., Boston, Mass.
American Pipe Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Bernz Co., Inc., Otto, Rochester, N. Y.
Blackhawk Mfg. Co., Milwaukee, Wis.
• Buffalo Forge Co., Buffalo, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Crown Die & Tool Co., Chicago, Ill. (Hand)
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Holsclaw Bros., Inc., Evansville, Ind.
Hossfeld Mfg. Co., Winona, Minn.
O'Neil Irwin Mfg. Co., Minneapolis, Minn.
• Pedrick Tool & Machine Co., Philadelphia, Pa.
Pines Engineering Co., Inc., Aurora, Ill.
Sac Tool Mfg. Co., St. Louis, Mo.
Shaw-Kendall Engineering Co., Toledo, O.
Tal's Prestal Bender, Inc., Milwaukee, Wis.
Toledo Pipe Threading Machine Co., Toledo, O.
Vanderman Mfg. Co., Willimantic, Conn.
Wallace Supplies Mfg. Co., Chicago, Ill.
• Watson-Stillman Co., Roselle, N. J.

BENDERS, TUBING

• American Pipe Bending Machine Co., Inc., Boston, Mass.
Armstrong Mfg. Co., Bridgeport, Conn.
Bernz Co., Inc., Otto, Rochester, N. Y.
• Buffalo Forge Co., Buffalo, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Everhot Products Co., Chicago, Ill.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Griffith Equipment Co., Inc., Los Angeles, Calif.
Hays Mfg. Co., Erie, Pa. (Copper Tube)
Holsclaw Bros., Inc., Evansville, Ind.
Hossfeld Mfg. Co., Winona, Minn.
Imperial Brass Mfg. Co., Chicago, Ill.
Keeney Mfg. Co., Newington, Conn.
Leonard Precision Products Co., Garden Grove, Calif.
Martin & Sons, H. P., Owensboro, Ky.
O'Neil Irwin Mfg. Co., Minneapolis, Minn.
Parker Appliance Co., Cleveland, O.
• Pedrick Tool & Machine Co., Philadelphia, Pa.
Perfection Refrigeration Parts Co., Harvey, Ill.
Pines Engineering Co., Inc., Aurora, Ill.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-On Tools Corp., Kenosha, Wis.
Steel City Electric Co., Pittsburgh, Pa.
Wallace Supplies Mfg. Co., Chicago, Ill.
• Watson-Stillman Co., Roselle, N. J.
Whitlock Mfg. Co., Hartford, Conn.

BENDS, EXPANSION, STEAM PIPE

American Locomotive Co., Alco Products Div., New York, N. Y.
Chicago Nipple Mfg. Co., Chicago, Ill.
Clow & Sons, James B., Chicago, Ill.
• Crane Co., Chicago, Ill.
Ellsworth Pipe & Supply Co., Milwaukee, Wis.
Flori Pipé Co., The, St. Louis, Mo.
• Grinnell Co., Inc., Providence, R. I.
Harris & Co., Arthur, Chicago, Ill. (Stainless & non-ferrous)
Harrisburg Steel Corp., Harrisburg, Pa.
Kellogg Co., M. W., The, New York, N. Y. (Corrugated steel)
Limbert & Co., Geo. B., Chicago, Ill.
Lumsden & Van Stone Co., South Boston, Mass.
• Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Pipe Bending Co., New Haven, Conn.
National Valve & Mfg. Co., Pittsburgh, Pa.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Oiljack Mfg. Co., Inc., Montclaire, N. J.
Parks-Cramer Co., Fitchburg, Mass.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw-Knox Co., Pittsburgh, Pa.
Rempe Co., Chicago, Ill.
Ric-wiL Co., Cleveland, O.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Shaw Co., Benjamin F., Wilmington, Del.
Shaw-Kendall Engineering Co., Toledo, O.
• Swan Engineering Co., Inc., Bloomfield, N. J.
U. S. Pipe & Mfg. Co., San Francisco, Calif.
• Walworth Co., New York, N. Y.
Western Piping & Engineering Co., San Francisco, Calif.

BI-METALS, THERMOSTATIC

Chace Co., W. M., Detroit, Mich.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Westinghouse Electric Corp., East Pittsburgh, Pa.
Wilson Co., H. A., The, Newark, N. J.

BLACKOUT VENTILATORS

See Ventilators, Blackout

BLADES, PROPELLER FAN

Ackermann Mfg. Co., Wheeling, W. Va.
Aerovent Fan Co., Piqua, O.
Air Controls, Inc., Cleveland, O.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
• Burden Fan & Blower Co., Los Angeles, Calif.
C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
Champion Blower & Forge Co., Lancaster, Pa.
• Chelsea Products, Inc., Irvington, N. J.

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Circulators & Devices Mfg. Corp., New York, N. Y.
Dallas Engineering Co., Inc., Dallas, Tex.
• DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dual Air Fan Co., Chicago, Ill.
• Dynamic Air Engineering, Inc., Los Angeles, Calif.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
International Engrg., Inc., Dayton, O.
Jeffrey Mfg. Co., Columbus, O.
• La-Del Conveyor & Mfg. Co., New Philadelphia, O.
Martin Fan & Blower Co., Chicago, Ill.
Meier Electric & Machine Co., Indianapolis, Ind.
Myers Electric Co., Inc., Pittsburgh, Pa.
Norwin Co., Freeport, Ill.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
Peerless Electric Co., Warren, O.
Propellair, Inc., Springfield, O.
Schwitzer-Cummins Co., Indianapolis, Ind.
• South Bend Air Products Corp., South Bend, Ind.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
Thermal Industries, Indio, Calif.
Torrington Mfg. Co., Torrington, Conn.
Utility Appliance Corp., Los Angeles, Calif.
Victor Electric Products, Inc., Cincinnati, O.

BLAST GATES

See Gates, Blast

BLAST HEATERS

See Surface, Heating

BLAST HEATING COILS

See Surface, Heating

BLOW PIPE FITTINGS

See Fittings, Blow Pipe

BLOWER FANS

See Fans, Axial Flow and Fans, Centrifugal

BLOWER HOUSINGS

See Housings, Fan

BLOWER WHEELS

See Wheels, Blower

BLOWERS, HIGH PRESSURE

For Low Pressure Blower Fans, See Fans, Centrifugal

Aladdin Heating Corp., Oakland, Calif.
Allen Billmyre Co., Mamaroneck, N. Y.
• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Blower Corp., Detroit, Mich.
Bayley Blower Co., Milwaukee, Wis.
Beach-Russ Co., New York, N. Y.
• Buffalo Forge Co., Buffalo, N. Y.
Buffalo Turbine Corp., Buffalo, N. Y.
Caldwell Co., Wm. J., Washington, D. C.
Carling Turbine Blower Co., Worcester, Mass.
Champion Blower & Forge Co., Lancaster, Pa.
• Chelsea Products, Inc., Irvington, N. J.
Circulators & Devices Mfg. Corp., New York, N. Y.
• Clarage Fan Co., Kalamazoo, Mich.
De Laval Steam Turbine Co., Trenton, N. J.
• Dynamic Air Engineering, Inc., Los Angeles, Calif.
Eclipse Fuel Engineering Co., Rockford, Ill.
Garden City Fan Co., Chicago, Ill.
• General Blower Co., Morton Grove, Ill.
Ingersoll-Rand Co., New York, N. Y.
L-R Mfg. Co., Blower Div., Torrington, Conn.
• La-Del Conveyor & Mfg. Co., New Philadelphia, O.
Lammert & Mann Co., Chicago, Ill.
Martin Fan & Blower Co., Chicago, Ill.
Muncie Gear Wks., Muncie, Ind.
National Gas Burners, Div. of Mid-Continent Metal Products Co., Chicago, Ill.
National Machine Works, Chicago, Ill.
North American Mfg. Co., Cleveland, O.
• Power Engineering Co., Chicago, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.
Spencer Turbine Co., Hartford, Conn.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
Trimount Rotary Power Co., East Bedham, Mass.
• United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Western Blower Co., Seattle, Wash.
• Wing Mfg. Co., L. J., New York, N. Y.

BLOWERS, SOOT

Bayer Co., St. Louis, Mo.
Diamond Power Specialty Corp., Detroit, Mich.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Marion Machine Foundry & Supply Co., Marion, Ind.
Perfection Grate & Stoker Co., Springfield, Mass.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.

BLOW-OFF VALVES

See Valves, Blow-off

BLUE PRINT MACHINES

See Machines, Blue Print and White Print

BOILER CLEANING COMPOUNDS

See Compounds, Boiler Cleaning

BOILER FEED PUMPS

See Pumps, Boiler Feed

BOILER FEEDERS

See Feeders, Water, Heating Boiler

BOILER OBSERVATION PORTS

See Ports, Observation, Boiler

BOILER SEALING COMPOUNDS

See Compounds, Boiler and Radiator Sealing

BOILER AND TANK INSULATION

See Insulation, Boiler and Tank

BOILER TUBES

See Tubes, Boiler

BOILER WATER ALARMS

See Alarms, High and Low Boiler Water

BOILERS, HEATING, CAST IRON, SECTIONAL

2000 Sq Ft Steam Radiation and Over

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Bastian-Morley Co., Inc., La Porte, Ind.
Bryan Steam Corp., Peru, Ind.
Bryant Heater Co., The, Cleveland, O.
• Burnham Boiler Corp., Irvington, N. Y.
Columbia Radiator Co., McKeesport, Pa.
• Crane Co., Chicago, Ill.
Eastern Foundry Co., Peerless Heater Div., Boyertown, Pa.
Herbert Boiler Co., Chicago, Ill.
International Heater Co., Utica, N. Y.
Kohler Co., Kohler, Wis.
• Mueller Furnace Co., L. J., Milwaukee, Wis.
• National Radiator Co., The, Johnstown, Pa.
Prox Co., Inc., Frank, Terre Haute, Ind.
Richmond Radiator Co., Gas Products Div., Uniontown, Pa.
• Smith Co., Inc., H. B., The, Westfield, Mass.
Spencer Heater Div., The Aviation Corp., Williamsport, Pa.
• Surface Combustion Corp., Toledo, O.
Thatcher Furnace Co., Garwood, N. J.
United States Radiator Corp., Detroit, Mich.
Weil-McLain Co., Chicago, Ill.

BOILERS, HEATING, STEEL, FIRE TUBE

2000 Sq Ft Steam Radiation and Over

Aldrich Co., The, Wyoming, Ill.
Ames Iron Wks., Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
Atlantic Steel Boiler Co., Philadelphia, Pa.
Bigelow Co., New Haven, Conn.
Birchfield Boiler, Inc., Tacoma, Wash.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Brownell Co., Dayton, O.
• Burnham Boiler Corp., Irvington, N. Y.
Cleaver-Brooks Co., Milwaukee, Wis.
Combination Boiler Co., Benton Harbor, Mich.
Combustion Engineering Co., Inc., New York, N. Y.
Cyclotherm Corp., New York, N. Y.
Dillon Steam Boiler Wks., Inc., D. M., Fitchburg, Mass.
Erie City Iron Wks., Erie, Pa.
Farrar & Trefts, Buffalo, N. Y.
• Fitzgibbons Boiler Co., Inc., New York, N. Y.
Frost Mfg. Co., Galesburg, Ill.
Gallaher Boiler Co., St. Louis, Mo.
Hamburg Boiler Works, Inc., Hamburg, Pa.
Hodge Boiler Wks., East Boston, Mass.
International Boiler Wks. Co., East Stroudsburg, Pa.
International Engineering Wks., Inc., Framingham, Mass.
Johnston Bros., Inc., Ferrysburg, Mich.
Keeler Co., Williamsport, Pa.
• Kewanee Boiler Corp., Kewanee, Ill.
Leffel & Co., James, Springfield, O.
Loline Steel Boiler Co., Allentown, Pa.
Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
Manitowoc Boiler Wks., Manitowoc, Wis.
Murray Iron Wks. Co., Burlington, Ia.
• National Radiator Co., The, Johnstown, Pa.
Orr & Sembower, Inc., Reading, Pa.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
Smith Twin Tubular Boiler Co., Inc., Philadelphia, Pa.
Spencer Heater Div., The Aviation Corp., Williamsport, Pa.
Terre Haute Boiler Works Co., Terre Haute, Ind.
Titusville Iron Wks. Co., Titusville, Pa.
Union Iron Wks., Erie, Pa.
Wickes Boiler Co., Saginaw, Mich.

BOILERS, HEATING, STEEL, WATER TUBE

Anetsberger Bros., Chicago, Ill.
Atlantic Steel Boiler Co., Philadelphia, Pa.
Babcock & Wilcox Co., New York, N. Y.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Combination Boiler Co., Benton Harbor, Mich.
Combustion Engineering Co., Inc., New York, N. Y.
Edge Moor Iron Wks., Inc., New York, N. Y.
Erie City Iron Wks., Erie, Pa.
International Boiler Wks. Co., East Stroudsburg, Pa.
International Engineering Wks., Inc., Framingham, Mass.
Keeler Co., E., Williamsport, Pa.

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Koven & Bro., Inc., L. O., Jersey City, N. J.
Murray Iron Wks. Co., Burlington, Ia.
Riley Stoker Corp., Worcester, Mass.
Smith Twin Tubular Boiler Co., Inc., Philadelphia, Pa.
Spencer Heater Div., The Aviation Corp., Williamsport, Pa.
Sullivan Valve & Engineering Co., Butte, Mont.
Super Mold Corp., Lodi, Calif.
• Titusville Iron Works Co., Titusville, Pa.
Union Iron Works, Erie, Pa.
Vapor Car Heating Co., Inc., Chicago, Ill.
Waterfilm Boilers, Inc., Jersey City, N. J.
Wickes Boiler Co., Saginaw, Mich.

BOILERS, STEAM GENERATING UNITS, HEATING AND PROCESS

Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
Bigelow Co., New Haven, Conn.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Bryan Steam Corp., Peru, Ind.
Clayton Mfg. Co., Alhambra, Calif.
Cleaver-Brooks Co., Milwaukee, Wis.
Cyclotherm Corp., New York, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Erie City Iron Works, Erie, Pa.
• Fitzgibbons Boiler Co., Inc., New York, N. Y.
Hodge Boiler Works, East Boston, Mass.
Hynes Electric Heating Co., Camden, N. J.
International Boiler Works Co., East Stroudsburg, Pa.
Johnson Co., S. T., Oakland, Calif.
Johnston Bros., Inc., Ferrysburg, Mich.
Keeler Co., E., Williamsport, Pa.
Leffel & Co., James, Springfield, O.
Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
Murray Iron Works Co., Burlington, Ia.
Orr & Sembower, Inc., Reading, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.
Sellers Engineering Co., Chicago, Ill.
• Smith Co., Inc., H. B., The, Westfield, Mass.
Stout & Sons, David, St. Louis, Mo.
Thermal Engineering Co., Chicago, Ill.
Vapor Car Heating Co., Inc., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.
Western Piping & Engineering Co., San Francisco, Calif.
Wickes Boiler Co., Saginaw, Mich.
• York-Shipley, Inc., Industrial Div., York, Pa.

BOLTS, EXPANSION

Chase Brass & Copper Co., Waterbury, Conn.
Chicago Expansion Bolt Co., Chicago, Ill.
Diamond Expansion Bolt Co., Inc., Garwood, N. J
Fee & Mason Mfg. Co., Inc., New York, N. Y.
Industrial Screw Co., Chicago, Ill.
National Lead Co., New York, N. Y.
Paine Co., Chicago, Ill.
Rawlplug Co., Inc., The, New York, N. Y.
Rolyan Metal Products, Chicago, Ill.
Star Expansion Bolt Co., New York, N. Y.
U. S. Expansion Bolt Co., York, Pa.

BOLTS AND STUDS, FLANGE

• Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., North Tonawanda, N. Y.
Carpenter & Paterson, Inc., East Boston, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Clark Bros. Bolt Co., Millidale, Conn.
• Crane Co., Chicago, Ill.
Erie Bolt & Nut Co., Erie, Pa.
Harper Co., H. M., Chicago, Ill.
Haskell Mfg. Co., Wm. H., Pawtucket, R. I.
Industrial Screw Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
Maintenance Engineering Corp., Houston, Tex.
Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS, TOGGLE AND ANCHOR

Buffalo Bolt Co., North Tonawanda, N. Y.
Carpenter & Paterson, Inc., East Boston, Mass.
Carty & Moore Engineering Co., Detroit, Mich.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Expansion Bolt Co., Chicago, Ill.
Crawford Co., Chicago, Ill.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Fee & Mason Mfg. Co., Inc., New York, N. Y.
Grabler Mfg. Co., Cleveland, O.
Industrial Screw Co., Chicago, Ill.
Moore Co., Goodloe E., Danville, Ill.
Paine Co., Chicago, Ill.
Rawlplug Co., Inc., The, New York, N. Y.
Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
Star Expansion Bolt Co., New York, N. Y.
U. S. Expansion Bolt Co., York, Pa.

BOOTHS, PAINTING, SPRAY

Aqua-Restor Div., Mayer Mfg. Corp., Brooklyn, N. Y.
• Binks Mfg. Co., Chicago, Ill.
DeVilbiss Co., The, Toledo, O.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Kirk & Blum Mfg. Co., Cincinnati, O.
Mahon Co., R. C., Detroit, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Schmieg Industries, Detroit, Mich.
Spray Engineering Co., Somerville, Mass.
Young & Bertke Co., Cincinnati, O.

BRAKES, SHEET METAL, HAND

Dreis & Krump Mfg. Co., Chicago, Ill.
Elker Mfg. Co., Ogallala, Neb.
Excelsior Tool & Machine Co., East St. Louis, Ill.
New Albany Machine Mfg. Co., New Albany, Ind.
Niagara Machine & Tool Works, Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Minneapolis, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
St. Louis Tool Co., St. Louis, Mo.
Weiss & Co., H., New York, N. Y.
Whitney Metal Tool Co., Rockford, Ill.

BRAKES, SHEET METAL, PORTABLE

Dreis & Krump Mfg. Co., Chicago, Ill.
Elker Mfg. Co., Ogallala, Neb.
Harris, A. R., Hammond, Ind.
O'Neil Irwin Mfg. Co., Minnepalois, Minn.
Whitney Metal Tool Co., Rockford, Ill.

BRAKES, SHEET METAL, POWER

Bath Co., Cyril, The, Cleveland, O.
Cincinnati Shaper Co., Cincinnati, O.
Dreis & Krump Mfg. Co., Chicago, Ill.
Heartley Machine & Tool Co., Toledo, O.
Ohl & Co., Geo. A., Newark, N. J.
Peck, Stow & Wilcox Co., Southington, Conn.
Rafter Machine Co., Belleville, N. J.
Verson Allsteel Press Co., Chicago, Ill.
Weiss & Co., H., New York, N. Y.
Whitney Metal Tool Co., Rockford, Ill.
Wilson Co., K. R., Buffalo, N. Y.

BRASS PIPE

See Pipe, Brass and Copper

BRASS TUBING

See Tubing, Brass and Copper

BRASS UNIONS

See Unions, Brass

BRASS VALVES

See Valves, Gate; and Valves, Globe

BRAZING TORCHES

See Torches, Brazing

BRONZE VALVES

See Valves, Gate; and Valves, Globe

BUILDING INSULATION

See Insulation, Building

BURNERS, GAS, COMMERCIAL AND INDUSTRIAL

Barber Gas Burner Co., Cleveland, O.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Bryant Heater Co., The, Cleveland, O.
Campbell Heating Co., E. K., Kansas City, Mo.
Conco Engineering Works, Div. of H. D. Conkey Co., Mendota, Ill.
Coppus Engineering Corp., Worcester, Mass.
Eclipse Fuel Engrg. Co., Rockford, Ill.
Engineer Co., New York, N. Y.
Enterprise Engine & Foundry Co., San Francisco, Calif.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Jamieson Mfg. Co., Dallas, Tex.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Martin, J. O. & C. U., San Francisco, Calif.
• Mettler Co., Lee B., Los Angeles, Calif.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National Gas Burners, Div. of Mid-Continent Metal Products Co., Chicago, Ill.
North American Mfg. Co., Cleveland, O.
Payne Furnace & Supply Co., Inc., Beverly Hills, Calif.
Peabody Engrg. Corp., New York, N. Y.
R-S Products Corp., Philadelphia, Pa.
Ray Oil Burner Co., San Francisco, Calif.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Ross Engineering Corp., J. O., New York, N. Y.
Rotary Mfg. Co., Los Angeles, Calif.
Schutte & Koerting Co., Philadelphia, Pa.
Selas Corp. of America, Philadelphia, Pa.
Sellers Engineering Co., Chicago, Ill.
Sonner Burner Co., Winfield, Kan.
Staples & Pfeiffer, San Francisco, Calif.
Stout & Sons, David, St. Louis, Mo.
Sullivan Valve & Engineering Co., Butte, Mont.
• Surface Combustion Corp., Toledo, O.
• Todd Shipyards Corp., Combustion Equipment Div., New York, N. Y.
• Webster Engineering Co., Tulsa, Okla.
Williams, Inc., F. C., Dearborn, Mich.
• Zink Co., John, Tulsa, Okla.

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BURNERS, GAS AND OIL COMBINED, COMMERCIAL AND INDUSTRIAL

Auburn Burner Co., Auburn, Ind.
Babcock & Wilcox Co., New York, N. Y.
Coppus Engineering Corp., Worcester, Mass.
Eclipse Fuel Engineering Co., Rockford, Ill.
Engineer Co., New York, N. Y.
Enterprise Engine & Foundry Co., San Francisco, Calif.
Johnson Co., S. T., Oakland, Calif.
Lammert & Mann Co., Chicago, Ill.
• Mettler Co., Lee B., Los Angeles, Calif.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Peabody Engineering Corp., New York, N. Y.
R-S Products Corp., Philadelphia, Pa.
Ray Oil Burner Co., San Francisco, Calif.
Ross Engineering Corp., J. O., New York, N. Y.
Sellers Engineering Co., Chicago, Ill.
Staples & Pfeiffer, San Francisco, Calif.
• Surface Combustion Corp., Toledo, O.
Thermal Engineering Co., Chicago, Ill.
• Todd Shipyards Corp., Combustion Equipment Div., New York, N. Y.
• Webster Engineering Co., Tulsa, Okla.
• Zink Co., John, Tulsa, Okla.

BURNERS, OIL, COMMERCIAL AND INDUSTRIAL

• Airtemp, Div. of Chrysler Corp., Dayton, O.
Babcock & Wilcox Co., New York, N. Y.
Bethlehem Foundry & Machine Co., Bethlehem, Pa.
Caloroil Burner Corp., Hartford, Conn.
Century Engrg. Corp., Cedar Rapids, Ia.
Chandler Co., Cedar Rapids, Ia.
Chisholm Co., Allen E., Portland, Ore.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Coppus Engineering Corp., Worcester, Mass.
Dalmo-Victor Co., San Carlos, Calif.
Eastern Oil & Equipment Co., Inc., Portland, Me.
Electrol Mfg. Co., Passaic, N. J.
Engineering Co., New York, N. Y.
Enterprise Engine & Foundry Co., San Francisco, Calif.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Hardinge Mfg. & Oil Burner Co., Chicago, Ill.
Harvey-Whipple, Inc., Springfield, Mass.
Holtum Mfg. Co., Freeport, Ill.
Jackson & Church Co., Saginaw, Mich.
Johnson Co., S. T., Oakland, Calif.
Kleen-Heet, Inc., Chicago, Ill.
Lammert & Mann Co., Chicago, Ill.
Littleford Bros., Cincinnati, O.
Malleable Iron Fittings Co., Branford, Conn.
May Oil Burner Corp., Baltimore, Md.
• Mettler Co., Lee B., Los Angeles, Calif.
Montag Stove & Furnace Works, Portland, Ore.
National Airoil Burner Co., Inc., Philadelphia, Pa.
North American Mfg. Co., Cleveland, O.
Nu-Way Corp., Rock Island, Ill.
Pan-American Engineering Co., Berkeley, Calif.
Peabody Engrg. Corp., New York, N. Y.
• Petroleum Heat & Power Co., Stamford, Conn.
Preferred Utilities Mfg. Corp., New York, N. Y.
Quiet Heet Mfg. Co., Newark, N. J.
R-S Products Corp., Philadelphia, Pa.
Ray Oil Burner Co., San Francisco, Calif.
Rayfield Co., C. L., Chicago, Ill.
Reif-Rexoil, Inc., Buffalo, N. Y.
Riley Stoker Corp., Worcester, Mass.
Ross Engineering Corp., J. O., New York, N. Y.
Rotary Mfg. Co., Los Angeles, Calif.
Schutte & Koerting Co., Philadelphia, Pa.
Scott-Newcomb, Inc., St. Louis, Mo.
Simplex Oil Heating Corp., New York, N. Y.
Staples & Pfeiffer, San Francisco, Calif.
Thermal Engineering Co., Chicago, Ill.
• Todd Shipyards Corp., Combustion Equipment Div., New York, N. Y.
• Webster Engineering Co., Tulsa, Okla.
Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
York-Heat Div., York-Shipley, Inc., York, Pa.
• Zink Co., John, Tulsa, Okla.

BURNERS, PULVERIZED COAL, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering Co., Inc., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.
Whiting Corp., Harvey, Ill.

BURNERS, PULVERIZED COAL AND GAS, COMBINED, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering Co., Inc., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.

BURNERS, PULVERIZED COAL AND OIL, COMBINED, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering Co., Inc., New York, N. Y.
Engineer Co., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.

CARBON DIOXIDE ANALYZERS

See Analyzers, Carbon Dioxide, Portable

CARBON DIOXIDE INDICATORS

See Indicators, Carbon Dioxide, Boiler Room

CARBON PIPE, TUBING, FITTINGS AND VALVES

See Pipe, Tubing, Fittings and Valves, Carbon

CAST IRON PIPE

See Pipe, Cast Iron

CEMENT AND COMPOUNDS, PIPE JOINT

Acme Refining Co., The, Cleveland, O.
Acorn Refining Co., Cleveland, O.
Akron Metallic Gasket Co., Akron, O.
Arco Co., Cleveland, O.
Atlas Chemical Co., Marietta, O.
Babbitt Industrial Specialties Co., New York, N. Y.
Baer Bros., New York, N. Y.
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Black Magic Products Co., Tulsa, Okla.
Blue Ridge Talc Co., Inc., Henry, Va.
Blue Seal Chemical Co., Roselle Park, N. J.
Bowser Inc., Fort Wayne, Ind.
Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Clinton Metallic Paint Co., Clinton, N. Y.
Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
Continental Products Co., Euclid, O.
Cooper Sanitary Co., Philadelphia, Pa.
• Crane Co., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Croll & Son, Jesse G., Philadelphia, Pa.
Detroit Graphite Co., Detroit, Mich.
Diamond Chemical Products, New York, N. Y.
Dixon Crucible Co., Joseph, Jersey City, N. J.
Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.
Greene, Tweed & Co., New York, N. Y.
• Grinnell Co., Inc., Providence, R. I.
Hercules Chemical Co., Inc., New York, N. Y.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., A. C., Long Island City, N. Y.
• Key Co., East St. Louis, Ill.
Keystone Asphalt Products Co., Chicago, Ill.
Krehbiel Co., J. H., Chicago, Ill.
• Lake Chemical Co., Chicago, Ill.
Macksons Co., New York, N. Y.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Montgomery Bros., San Francisco, Calif.
National Engineering Products, Inc., Washington, D. C.
Nebel Mfg. Co., Cleveland, O.
Pecora Paint Co., Inc., Philadelphia, Pa.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Permatex Co., Inc., Brooklyn, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Rockwood Sprinkler Co., Worcester, Mass.
• Rutland Fire Clay Co., Rutland, Vt.
Sauereisen Cements Co., Pittsburgh, Pa.
Schundler & Co., F. E., Long Island City, N. Y.
Smooth-On Mfg. Co., Jersey City, N. J.
Star Products Co., New York, N. Y.
Thompson & Co., Pittsburgh, Pa.
United States Stoneware Co., New York, N. Y.
Utility Laboratory, Inc., Brooklyn, N. Y.
Wilhelm Co., A., Reading, Pa.
• X Laboratories, Inc., New York, N. Y.
X-Pando Corp., Long Island City, N. Y.

CEMENT, FURNACE

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Armstrong Co., Detroit, Mich.
Botfield Refractories Co., Philadelphia, Pa.
Buckeye Products Co., Cincinnati, O.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Chicago Fire Brick Co., Chicago, Ill.
Clinton Metallic Paint Co., Clinton, N. Y. (Asbestos)
Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
Continental Products Co., Euclid, O.
Diamond Chemical Products, New York, N. Y.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Fireline Stove & Furnace Lining Co., Chicago, Ill.
Glidden Co., Cleveland, O.
• Grant Wilson, Inc., Chicago, Ill. (Asbestos)
Green Fire Brick Co., A. P., Mexico, Mo.
Hercules Chemical Co., Inc., New York, N. Y.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y. (Asbestos)
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Lastik Products Co., Inc., Pittsburgh, Pa.

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McLeod & Henry Co., Inc., Troy, N. Y.
Munn and Steel, Inc., Newark, N. J.
Nebel Mfg. Co., Cleveland, O.
Pecora Paint Co., Philadelphia, Pa.
Plastic Products Co., Detroit, Mich.
Preferred Utilities Mfg. Corp., New York, N. Y.
Presstite Engineering Co., St. Louis, Mo.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
Refractory & Insulation Corp., New York, N. Y.
Ruberoid Co., New York, N. Y.
• Rutland Fire Clay Co., Rutland, Vt.
Sall Mountain Co., Chicago, Ill.
Sauereisen Cements Co., Pittsburgh, Pa.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Tamms Silica Co., Chicago, Ill.
Taylor Sons Co., Charles, Cincinnati, O.
United States Stoneware Co., New York, N. Y.
Walsh Refractories Corp., St. Louis, Mo.
Wilhelm Co., A., Reading, Pa.
• Wilson, Grant, Inc., Chicago, Ill. (Asbestos)

CEMENT, INSULATING

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Alton Mineral Wool Insulation Co., Alton, Ill.
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Barrett Div., The, Allied Chemical & Dye Corp., New York N. Y.
Bird-Archer Co., Philadelphia, Pa.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Carney Rockwool Co., Mankato, Minn.
Chicago Fire Brick Co., Chicago, Ill.
Clinton Metallic Paint Co., Clinton, N. Y.
Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
Diamond Chemical Products, New York, N. Y.
Eagle-Picher Lead Co., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Elmer & Amend, New York, N. Y.
• Grant Wilson, Inc., Chicago, Ill.
Green Fire Brick Co., A. P., Mexico, Mo.
Industrial Research, Lansdowne, Pa.
International Vermiculite Co., Girard, Ill.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Krehbiel Co., J. H., Chicago, Ill. (Asbestos, mineral wool)
McLeod & Henry Co., Inc., Troy, N. Y.
Munn and Steele, Inc., Newark, N. J.
National Engineering Products, Inc., Washington, D. C.
National Gypsum Co., Buffalo, N. Y.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
Ohmiac Paint & Refining Co., Chicago, Ill.
Owens-Corning Fiberglas Corp., Toledo, O.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Plant Rubber & Asbestos Works, San Francisco, Calif.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Poe Co., C. W., Cleveland, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Rex Clay Products Co., Detroit, Mich.
Robinson Insulation Co., Great Falls, Mont.
Rock Fleece Co., El Paso, Tex.
Ruberoid Co., New York, N. Y.
• Rutland Fire Clay Co., Rutland, Vt.
Sall Mountain Co., Chicago, Ill.
Sauereisen Cements Co., Pittsburgh, Pa. (Electrical)
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Elizabeth, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Tennessee Products Corp., Nashville, Tenn.
Therminsul Corp., Kalamazoo, Mich.
Thompson & Co., Pittsburgh, Pa.
United States Mineral Wool Co., Chicago, Ill.
Universal Zonolite Insulation Co., Chicago, Ill.
Westinghouse Electric Corp., East Pittsburgh, Pa.
• Wilson, Inc., Grant, Chicago, Ill.

CENTRIFUGAL PUMPS

See Pumps, Centrifugal

CHAIN DRIVES

See Drives, Chain

CHAMBERS, TEST, CONTROLLED TEMPERATURE AND HUMIDITY

American Coils, Inc., Newark, N. J.
Atlas Electric Devices Co., Chicago, Ill.
• Tenney Engineering, Inc., Newark, N. J.

CHANGERS, SPEED, HYDRAULIC COUPLING

American Blower Corp., Detroit, Mich.

CHANGERS, SPEED, MECHANICAL

• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Browning Mfg. Co., Inc., Maysville, Ky.
Doall Co., The, Des Plaines, Ill.
Dodge Mfg. Corp., Mishawaka, Ind.
Graham Transmissions, Inc., Milwaukee, Wis.
Ideal Commutator Dresser Co., Sycamore, Ill.
Lewellen Mfg. Co., Columbus, Ind.
Link-Belt Co., Philadelphia, Pa.
Reeves Pulley Co., Columbus, Ind.
Standard Transmission Equipment Co., Los Angeles, Calif.
Salsbury Motors, Inc., Los Angeles, Calif.
• Stephens-Adamson Mfg. Co., Aurora, Ill.
Webster Electric Co., Racine, Wis.
White Mfg. Co., St. Paul, Minn.

CHECK VALVES

See Valves, Check

CHILLERS, WATER, FOR AIR CONDITIONING AND REFRIGERATION

• Acme Industries, Inc., Jackson, Mich.
• Baker Ice Machine Co., Inc., Omaha, Neb.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
• Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Downingtown, Pa.
Drayer & Hanson, Inc., Los Angeles, Calif.
Filtrine Mfg. Co., Brooklyn, N. Y.
Frick Co., Waynesboro, Pa.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Griscom-Russell Co., The, New York, N. Y.
Heat Transfer Products, Inc., Carbondale, Pa.
Howe Ice Machine Co., Chicago, Ill.
• Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
Larkin Coils, Atlanta, Ga.
• McQuay, Inc., Minneapolis, Minn.
Niagara Blower Co., New York, N. Y.
• Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Peerless of America, Inc., Chicago, Ill.
Phillips Cooling Tower Co., Inc., New York, N. Y.
Refrigeration Economics Co., Inc., Canton, O.
Richmond Engineering Co., Inc., Richmond, Va.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Temprite Products Corp., Detroit, Mich.
• Trane Co., The, La Crosse, Wis.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Springfield, Mass.
Whitlock Mfg. Co., Hartford, Conn.
• Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

CIRCULATORS FOR HOT WATER HEATING SYSTEMS

American-Marsh Pumps, Inc., Battle Creek, Mich.
• Bell & Gossett Co., Morton Grove, Ill.
Columbus Steam Pump Works Co., Columbus, O.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
• Hoffman Specialty Co., Indianapolis, Ind.
Hotstream Heater Co., Cleveland, O.
Kaiser & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Taco Heaters, Inc., New York, N. Y.
• Thrush & Co., H. A., Peru, Ind.
• Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Peru, Ind.
White Flo-Matic Corp., Hoosick Falls, N. Y.

CLAMPS, BEAM, PIPE HANGING

Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Carpenter & Paterson, Inc., East Boston, Mass.
Chicago Nipple Mfg. Co., Chicago, Ill.
• Crane Co., Chicago, Ill.
Crawford Co., Chicago, Ill.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Farley Sleeve & Hanger Co., Cleveland, O.
Fee & Mason Mfg. Co., Inc., New York, N. Y.
Frick Co., Waynesboro, Pa.
Globe Machine & Stamping Co., Div. of Hupp Motor Car Corp., Cleveland, O.
Grabler Mfg. Co., Cleveland, O.
• Grinnell Co., Inc., Providence, R. I.
Jarecki Mfg. Co., Erie, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
Paine Co., Chicago, Ill.
• Walworth Co., New York, N. Y.

CLAMPS, HOSE

Everhot Products Co., Chicago, Ill.
• Tinnerman Products, Inc., Cleveland, O.

CLAMPS, PIPE REPAIR

Alten's Foundry & Machine Works, Lancaster, O.
Chelsea Metal Stamping Co., New York, N. Y.

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Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Jarecki Mfg. Co., Erie, Pa.
Skinner Co., M. B., South Bend, Ind.
Smooth-On Mfg. Co., Jersey City, N. J.
• Yarnall-Waring Co., Philadelphia, Pa.

CLAMPS, PIPE, WELDING

• Detroit Stamping Co., Detroit, Mich.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Jewel Mfg. Co., St. Paul, Minn.
Williams & Co., J. H., Buffalo, N. Y.

CLEANERS, AIR, ELECTRICAL

• American Air Filter Co., Inc., Louisville, Ky.
Westinghouse Electric Corp., Cleveland, O.

CLEANERS, TUBE

Albright Equipment Co., Johnstown, Pa.
Armstrong Mfg. Co., Bridgeport, Conn.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Elliott Co., Jeannette, Pa.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Osborn Mfg. Co., Cleveland, O.
Perfection Grate & Stoker Co., Springfield, Mass.
Pierce Co., Wm. B., The, Buffalo, N. Y.
Pilley Brush Co., Fort Madison, Ia.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Spencer Turbine Co., Hartford, Conn.
Stow Mfg. Co., Binghampton, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J. (for slime and scale)

CLEANERS, VACUUM, FOR BOILERS

Ideal Commutator Dresser Co., Sycamore, Ill.
Whittington Pump & Engineering Co., Indianapolis, Ind.

CLEANING COMPOUNDS

See Compounds, Cleaning, Pipe Coil and Condenser

CLEANING COMPOUNDS, AIR FILTER

See Compounds, Cleaning, Air Filter

COAL BURNERS

See Burners, Pulverized Coal; Stokers

COAL CONVEYORS

See Conveyors, Coal and Ash

COATINGS, PROTECTIVE, FOR METALS

Aeroil Products Co., West New York, N. J.
Alrose Chemical Co., Providence, R. I.
Amercoat Div., American Pipe & Construction Co., Los Angeles, Calif.
American Solder & Flux Co., Philadelphia, Pa. (Galvanizing powder)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Blue Ridge Talc Co., Inc., Henry, Va.
Bonafide Genasco, Inc., New York, N. Y.
Bart Mfg. Co., Belleville, N. J.
Cabot, Inc., Samuel, Boston, Mass. (Bituminous black paint)
Cordo Chemical Co., Norwalk, Conn.
Dampney Co. of America, Boston, Mass.
Dearborn Chemical Co., Chicago, Ill. (Rust preventive)
Debevoise Co., The, Brooklyn, N. Y. (Cement)
du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept., Wilmington, Del.
Flintkote Co., The, New York, N. Y. (Asphalt emulsions)
Galv-Weld Products, Dayton, O. (Regalvanizing)
Goodrich Co., B. F., Akron, O.
Haering Co., Inc., D. W., Chicago, Ill. (Drying and non-drying)
Johnson Co., Lloyd S., Chicago, Ill.
Laclede-Christy Clay Products Co., St. Louis, Mo. (High temperature paint)
Lastik Products Co., Inc., Pittsburgh, Pa.
Miracle Adhesives Corp., Newark, N. J.
Mortell Co., J. W., Kankakee, Ill. (Asphalt)
National Lead Co., New York, N. Y. (Red lead)
Nebel Mfg. Co., Cleveland, O.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Ohmlac Pain & Refining Co., Chicago, Ill. (Acid resistant, heat resistant)
Penn Galvanizing Co., Philadelphia, Pa. (Galvanizing)
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa. (Paint, varnish, laquer)
Protective Coatings, Inc., Detroit, Mich.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Reilly Tar & Chemical Corp., Indianapolis, Ind. (Coal tar base)
Rheem Mfg. Co., San Francisco, Calif.
Ric-wiL Co., Cleveland, O.
Roxalin Flexible Finishes, Inc., Elizabeth, N. J.
Saverite Engineering Co., Hoboken, N. J.
Socony Paint Products, Div. of Socony-Vacuum Oil Co., Inc., New York, N. Y.
Sonneborn Sons, Inc., L., New York, N. Y.
• Turco Products, Inc., Los Angeles, Calif.
United Chromium, Inc., New York, N. Y.
United States Stoneware Co., New York, N. Y. (Corrosion resistant)
Vesco Corp., New York, N. Y.
Walles Dove-Hermiston Corp., Westfield, N. J. (Coal tar)
Wilbur & Williams Co., Boston, Mass.
Wipe-On Corp., New York, N. Y.
Wolfe-Kote Co., Sheboygan, Wis.
X-Pando Corp., Long Island City, N. Y.

COCKS, BOILER GAGE

American Injector Co., Detroit, Mich.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bordo Co., Inc., L. J., Glenside, Pa.
• Crane Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Klingerit, Inc., New York, N. Y.
Lunkenheimer Co., Cincinnati, O.
Reliance Gauge Column Co., Cleveland, O.
Williams Gauge Co., Pittsburgh, Pa.
Wright-Austin Co., Detroit, Mich.

COILS

See Surface, Cooling; Surface, Heating

COILS, FOR HOT WATER STORAGE TANKS

American Cooling Tower Co., Kansas City, Mo.
• American District Steam Co., North Tonawanda, N. Y.
• Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Downingtown, Pa.
Everhot Products Co., Chicago, Ill.
Heat Transfer Products, Inc., Carbondale, Pa.
Howard Iron Works & Alberger Heater Co., Buffalo, N. Y.
• Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
Kopperman & Sons, Joseph, Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
• Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
• Swan Engineering Co., Inc., Bloomfield, N. J.
Taco Heaters, Inc., New York, N. Y.
U. S. Pipe & Mfg. Co., San Francisco, Calif.
Whitlock Mfg. Co., Hartford, Conn.

COILS, PIPE

American Cooling Towers Co., Kansas City, Mo.
• Acme Industries, Inc., Jackson, Mich.
American Smelting & Refining Co., New York, N. Y.
• Baker Ice Machine Co., Inc., Omaha, Neb.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Chicago Nipple Mfg. Co., Chicago, Ill.
• Crane Co., Chicago, Ill.
Downs-Smith Brass & Copper Co., New York, N. Y.
Ellsworth Pipe & Supply Co., Milwaukee, Wis.
Flori Pipe Co., The, St. Louis, Mo.
Frick Co., Waynesboro, Pa.
Harris & Co., Arthur, Chicago, Ill.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Limbert & Co., Geo. B., Chicago, Ill.
• Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
• Mueller Brass Co., Port Huron, Mich.
National Pipe Bending Co., New Haven, Conn.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Rempe Co., Chicago, Ill.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Semet-Solvay Engineering Corp., New York, N. Y.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
• Swan Engineering Co., Inc., Bloomfield, N. J.
U. S. Pipe & Mfg. Co., San Francisco, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Whitlock Mfg. Co., Hartford, Conn.

COLLECTORS, DUST

Aerotec Co., White Plains, N. Y.
Aget-Detroit Co., Ann Arbor, Mich.
Allen Billmyre Co., Mamaroneck, N. Y.
Allington & Curtis Mfg. Co., Saginaw, Mich.
• American Air Filter Co., Louisville, Ky.
American Blower Corp., Detroit, Mich.
American Foundry Equipment Co., Mishawaka, Ind.
American Metal Products Co., Fort Worth, Tex.
Aqua-Restor Div., Mayer Mfg. Corp., Brooklyn, N. Y.
Bargar Sheet Metal Co., Cleveland, O.
Bayley Blower Co., Milwaukee, Wis.
Blower Application Co., Milwaukee, Wis.
Bubar, Hudson H., New York, N. Y.
• Buffalo Forge Co., Buffalo, N. Y.
Buffalo Tank Corp., Dunellen, N. J.
Centri-Spray Co., Detroit, Mich.
Clark Dust Control Co., Chicago, Ill.
Columbian Steel Tank Co., Kansas City, Mo.
Day Co., The, Minneapolis, Minn.
Diamond Power Specialty Corp., Detroit, Mich.
Dracco Corp., Cleveland, O.
Dust Filter Co., Chicago, Ill.
Goethel Sheet Metal Wks., Alfred, Milwaukee, Wis.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Ideal Commutator Dresser Co., Sycamore, Ill.
Indiana Fan Company, Indianapolis, Ind.

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Jacobs Co., B. & J., Cincinnati, O.
Kirk & Blum Mfg. Co., Cincinnati, O.
Kluegel & Co., E., St. Paul, Minn.
Knickerbocker Co., Jackson, Mich.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Lumm Co., A. H., Toledo, O.
Northern Blower Co., Cleveland, O.
Pangborn Corp., Hagerstown, Md.
Peters-Dalton, Inc., Detroit, Mich.
Prat-Daniel Corp. Port Chester, N. Y.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Research Corp., New York, N. Y.
Ruemelin Mfg. Co., Milwaukee, Wis.
Schmieg Industries, Detroit, Mich.
Schneible Co., Claude B., Detroit, Mich.
• Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Sly Mfg. Co., W. W., Cleveland, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Spencer Turbine Co., Hartford, Conn.
Steinhorst & Sons, Inc., Emil, Utica, N. Y.
Strandwitz & Co., Inc., W. J., Camden, N. J.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
Torit Mfg. Co., St. Paul, Minn.
Western Blower Co., Seattle, Wash.
Western Precipitation Corp., Los Angeles, Calif.
Whiting Corp., Harvey, Ill.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
Young & Bertke Co., Cincinnati, O.

COMBUSTION CONTROL

See Controls, Draft, Barometric; Regulators, Draft, Combustion; Systems, Combustion Control

COMBUSTION RECORDERS

See Recorders, Carbon Dioxide

COMPOUNDS, AIR FRESHENING

Lundy Co., E. A., New York, N. Y.
• Wheeler, Inc., W. H., New York, N. Y.

COMPOUNDS, BOILER CLEANING

Acme Refining Co., The, Cleveland, O.
Agnew & Tomlinson, New York, N. Y.
American K. A. T. Corp., New York, N. Y.
American Teksag Products, Inc., Mount Vernon, N. Y.
• Anderson-Stolz Corp., Kansas City, Mo.
• Apex Engineering Co., Chicago, Ill.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Bird-Archer Co., Philadelphia, Pa.
Blue Seal Chemical Co., Roselle Park, N. J.
Brown-Ford Corp., Newton, Mass.
Cannon Chemical Co., Everett, Mass.
Chicago Specialty Mfg. Co., Chicago, Ill.
Continental Products Co., Euclid, O.
Dearborn Chemical Co., Chicago, Ill.
Diamond Chemical Products, New York, N. Y.
Ferro-Nil Corp., New York, N. Y.
Grief, Edward C., Bogota, N. J.
Haering & Co., Inc., D. W., Chicago, Ill.
• Hagan Corp., Pittsburgh, Pa.
Hercules Chemical Co., Inc., New York, N. Y.
Hood Refining Co., Greensburg, Pa.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Krehbiel Co., J. H., Chicago, Ill.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Aluminate Corp., Chicago, Ill.
North American Fibre Products Co., The, Cleveland, O.
Permutit Co., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
• Turco Products, Inc., Los Angeles, Calif.
Utility Laboratory, Inc., Brooklyn, N. Y.
Vinco Co., Inc., The, New York, N. Y.
Water Service Laboratories, Inc., New York, N. Y.
Western Chemical Co., Kansas City, Mo.
• X Laboratories, Inc., New York, N. Y.

COMPOUNDS, BOILER AND RADIATOR SEALING

Atlas Chemical Co., Marietta, O.
Blue Seal Chemical Co., Roselle Park, N. J.
Cannon Chemical Co., Everett, Mass.
Chicago Specialty Mfg. Co., Chicago, Ill.
Cooper Sanitary Co., Philadelphia, Pa.
Dearborn Chemical Co., Chicago, Ill.
Desolvo Co., The, Pittsburgh, Pa.
Diamond Chemical Products, New York, N. Y.
Halowax Products Div., Union Carbide & Carbon Corp., New York, N. Y.
Hampton-Cross Co., The, Louisville, Ky.
Hercules Chemical Co., Inc., New York, N. Y.
Krehbiel Co., J. H., Chicago, Ill.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Engineering Products, Inc., Washington, D. C.
Permatex Co., Inc., Brooklyn, N. Y.
Radiator Specialty Co., Charlotte, N. C.
Star Products Co., New York, N. Y.
Utility Laboratory, Inc., Brooklyn, N. Y.
Vinco Co., Inc., The, New York, N. Y.
• X Laboratories, Inc., New York, N. Y.

COMPOUNDS, CAULKING

Accurate Metal Weather Strip Co., New York, N. Y.
Acme Refining Co., The, Cleveland, O.
Acme White Lead & Color Works, Detroit, Mich.
Acorn Refining Co., Cleveland, O.
All Metal Weatherstrip Co., Chicago, Ill.
American-Marietta Co., Chicago, Ill.
American Metal Weather Strip Co., Grand Rapids, Mich.
Arco Co., Cleveland, O.
Armstrong Co., The, Detroit, Mich.
Asphalt Products Co., Syracuse, N. Y.
Babbitt Industrial Specialties Co., New York, N. Y.
Blue Ridge Talc Co., Henry, Va.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Cincinnati, O.
Carter Paint Co., Liberty, Ind.
Chamberlin Co. of America, Detroit, Mich.
Cheeseman-Elliot Co., Inc., Brooklyn, N. Y.
Clinton Metallic Paint Co., Clinton, N. Y.
Continental Products Co., Euclid, O.
Cordo Chemical Co., Norwalk, Conn.
Eagle-Picher Co., Cincinnati, O.
Flintkote Co., The, New York, N. Y.
Ford Roofing Products Co., Chicago, Ill.
Glidden Co., Cleveland, O.
Goodrich Co., B. F., Akron, O.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., A. C., Long Island City, N. Y.
Iowa Paint Mfg. Co., Des Moines, Ia.
Johns-Manville, New York, N. Y.
Krehbiel Co., J. H., Chicago, Ill.
Lastik Products Co., Inc., Pittsburgh, Pa.
Lehon Co., Chicago, Ill.
Maas & Waldstein Co., Newark, N. J.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Midland Paint & Varnish Co., Cleveland, O.
Mortell Co., J. W., Kankakee, Ill.
National Mfg. Corp., Tonawanda, N. Y.
Nebel Mfg. Co., Cleveland, O.
North American Fibre Products Co., The, Cleveland, O.
Ohmiac Paint & Refining Co., Chicago, Ill.
Pecora Paint Co., Philadelphia, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Plastic Products Co., Detroit, Mich.
Presstite Engineering Co., St. Louis, Mo.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Sherwin-Williams Co., The, Cleveland, O.
Sipe & Co., James B., Pittsburgh, Pa.
Smooth-On Mfg. Co., Jersey City, N. J.
Sonneborn Sons, Inc., L., New York, N. Y.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
Tamms Silica Co., Chicago, Ill.
Thompson & Co., Pittsburgh, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit, Mich.
United States Stoneware Co., New York, N. Y.
Wilhelm Co., A., Reading, Pa.
X-Pando Corp., Long Island City, N. Y.
Yardley Industries, Columbus, O.

COMPOUNDS, CLEANING, AIR FILTER

Oakite Products, Inc., New York, N. Y.
• Turco Products, Inc., Los Angeles, Calif.

COMPOUNDS, CLEANING, PIPE COIL AND CONDENSER

• Anderson-Stolz Corp., Kansas City, Mo.
• Apex All Weather Products, Chicago, Ill.
• Apex Engineering Co., Chicago, Ill.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blue Seal Chemical Co., Roselle Park, N. J.
Cannon Chemical Co., Everett, Mass.
• Carolina Aniline & Extract Co., Inc., Charlotte, N. C.
Dearborn Chemical Co., Chicago, Ill.
• Dowell, Inc., Tulsa, Okla.
Haering Co., Inc., D. W., Chicago, Ill.
Hercules Chemical Co., Inc., New York, N. Y.
National Airoil Burner Co., Inc., Philadelphia, Pa.
North American Fibre Products Co., The, Cleveland, O.
Oakite Products, Inc., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
• Turco Products, Inc., Los Angeles, Calif.
Utility Laboratory, Inc., Brooklyn, N. Y.
Western Chemical Co., Kansas City, Mo.

COMPOUNDS, WELDING

American Solder & Flux Co., Philadelphia, Pa.
Midland Paint & Varnish Co., Cleveland, O.
• Turco Products, Inc., Los Angeles, Calif.
Universal Power Corp., Cleveland, O.
Wolfe-Kote Co., Sheboygan, Wis.

COMPRESSION PIPE FITTINGS

See Fittings, Pipe, Compression

COMPRESSOR BASES

See Bases and Pads, Vibration Isolating

COMPRESSOR VALVES

See Valves, Compressor

• Advertisement in this issue. See Index to Advertisers, pages 367-368.

COMPRESSORS, AIR

Allen Billmyre Co., Mamaroneck, N. Y.
• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Beach-Russ Co., New York, N. Y.
• Binks Mfg. Co., Chicago, Ill.
Brunner Mfg. Co., Utica, N. Y.
Buffalo Turbine Corp., Buffalo, N. Y.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
Cooper Co., Clark, Palmyra, N. J.
• Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Davey Compressor Co., Kent, O.
Dayton Air Compressor Co., Dayton, O.
DeVilbiss Co., The, Toledo, O.
Essick Mfg. Co., Los Angeles, Calif.
Fuller Co., Catasauqua, Pa.
Gardner-Denver Co., Quincy, Ill.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Hobart Bros. Co., Troy, O.
Ingersoll-Rand Co., New York, N. Y.
Lammert & Mann Co., Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Nash Engineering Co., South Norwalk, Conn.
North Penn Co., New York, N. Y.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Plummer Spray Equipment Co., Napoleon, O.
Schramm, Inc., West Chester, Pa.
Spencer Turbine Co., Hartford, Conn.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
Sullivan Machinery Co., Michigan City, Ind.
Trimount Rotary Power Co., East Dedham, Mass.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

COMPRESSORS, REFRIGERATING, CENTRIFUGAL

• Carrier Corp., Syracuse, N. Y. (Carrene)
DeLaval Steam Turbine Co., Trenton, N. J. (Water vapor)
Ingersoll-Rand Co., New York, N. Y. (Water vapor)
• Trane Co., The, La Crosse, Wis.
• United States Air Conditioning Corp., Minneapolis, Minn.
• Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.
York Corp., York, Pa.

COMPRESSORS, REFRIGERATING, RECIPROCATING

• Airtemp, Div. of Chrysler Corp., Dayton, O. (Radial)
• Baker Ice Machine Co., Inc., Omaha, Neb. ("Freon," Methyl chloride, Ammonia)
Brunner Mfg. Co., Utica, N. Y. (Methyl chloride, "Freon," sulphur dioxide)
• Carrier Corp., Syracuse, N. Y. ("Freon")
Copeland Refrigeration Corp., Sidney, O.
• Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Diceler Corp., The, Berwick, Pa.
Frick Co., Waynesboro, Pa. (Ammonia, carbon dioxide, methyl chloride, "Freon")
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Machinery Co., Spokane, Wash.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Howe Ice Machine Co., Chicago, Ill. ("Freon," ammonia, methyl chloride)
Ingersoll-Rand Co., New York, N. Y.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kelvinator Div., Nash-Kelvinator Corp., Detroit, Mich.
Lehigh Foundries, Inc., Refrigeration Div., Lancaster, Pa.
Lynch Mfg. Corp., Defiance, O.
Mills Industries, Inc., Chicago, Ill.
Reliance Refrigerating Machine Co., Chicago, Ill. ("Freon," methyl chloride, ammonia)
Reynolds Mfg. Co., Inc., Springfield, Mo.
Servel, Inc., Electric Refrigeration Div., Evansville, Ind. ("Freon," methyl chloride)
Starr Piano Co., Richmond, Ind.
Stewart Ice Machine Co., Los Angeles, Calif.
Tecumseh Products Co., Tecumseh, Mich.
• Trane Co., The, La Crosse, Wis.
Universal Cooler Div. of International Detrola Corp., Marion, O. (Methyl chloride, "Freon")
Vilter Mfg. Co., Milwaukee, Wis. ("Freon," ammonia)
Westinghouse Electric Corp., Springfield, Mass.
Williams Oil-O-Matic Heating Corp., Bloomington, Ill. ("Freon," methyl chloride)
Wittenmeier Machinery Co., Chicago, Ill. (Carbon dioxide)
• Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill. (Ammonia, methyl chloride)
York Corp., York, Pa. (Carbon dioxide, ammonia, "Freon")

COMPRESSORS, REFRIGERATING, STEAM JET

Croll-Reynolds Engrg. Co., Inc., New York, N. Y.
Elliott Co., Jeannette, Pa.
Graham Mfg. Co., Inc., New York, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Westinghouse Electric Corp., East Pittsburgh, Pa.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
• Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.

COMPRESSORS, STEAM BOOSTER

Blackburn-Smith Mfg. Co., Hoboken, N. J.
Buffalo Turbine Corp., Buffalo, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

CONDENSATION METERS

See Meters, Condensation

CONDENSATION PUMPS

See Pumps, Condensation

CONDENSERS, REFRIGERATING, EVAPORATIVE

• Acme Industries, Inc., Jackson, Mich.
American Cooling Tower Co., Kansas City, Mo.
• Baker Ice Machine Co., Inc., Omaha, Neb.
• Buffalo Forge Co., Buffalo, N. Y.
• Carrier Corp., Syracuse, N. Y.
• Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer & Hanson, Inc., Los Angeles, Calif.
Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
G & O Mfg. Co., New Haven, Conn.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Harry Cooling Towers, Inc., New York, N. Y.
Hess Warming & Ventilating Co., Chicago, Ill.
• Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
Larkin Coils, Atlanta, Ga.
Long Mfg., Div. Borg-Warner Corp., Detroit, Mich.
• Mario Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
• Murray Mfg. Co., D. J., Wausau, Wis.
• New England Cooling Tower Co., Boston, Mass.
Niagara Blower Co., New York, N. Y.
• Peerless of America, Inc., Chicago, Ill.
• Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Richmond Engrg. Co., Inc., Richmond, Va.
• Trane Co., The, La Crosse, Wis.
• United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., East Pittsburgh, Pa.
• Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
XL Refrigerating Co., Chicago, Ill.
Yates-American Machine Co., Beloit, Wis.
York Corp., York, Pa.
• Young Radiator Co., Racine, Wis.

CONDENSERS, REFRIGERATING, SHELL AND COIL

• Acme Industries, Inc., Jackson, Mich.
• Baker Ice Machine Co., Inc., Omaha, Neb.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Downingtown Iron Works, Downingtown, Pa.
• Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Vilter Mfg. Co., Milwaukee, Wis.
Whitlock Mfg. Co., Hartford, Conn.
• Young Radiator Co., Racine, Wis.

CONDENSERS, REFRIGERATING, SHELL AND TUBE

• Acme Industries, Inc., Jackson, Mich.
• Airtemp, Div. of Chrysler Corp., Dayton, O.
• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Andale Co., Philadelphia, Pa.
• Baker Ice Machine Co., Inc., Omaha, Neb.
Bigus Boiler Works Co., E. Akron, O.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
• Carrier Corp., Syracuse, N. Y. (Carrene)
Chase Brass & Copper Co., Waterbury, Conn.
• Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., Inc., J. P., Mt. Vernon, Ill.
Downingtown Iron Works, Downingtown, Pa.
Drayer & Hanson, Inc., Los Angeles, Calif.
Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Heat Transfer Products, Inc., Carbondale, Pa.
Howard Iron Works & Alberger Heater Co., Buffalo, N. Y.
Howe Ice Machine Co., Chicago, Ill.
• Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
Kopperman & Sons, Joseph, Philadelphia, Pa.

Kramer Trenton Co., Trenton, N. J.
Ohio Pipe Bending & Machine Co., Cleveland, O.
• Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
• Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Refrigeration Economics Co., Inc., Canton, O.
Reliance Refrigerating Machine Co., Chicago, Ill.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Richmond Engrg. Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Servel, Inc., Electric Refrigeration Div., Evansville, Ind.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Stewart Ice Machine Co., Los Angeles, Calif.
Struthers Wells Corp., Titusville, Pa.
• Trane Co., The, LaCrosse, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Westinghouse Electric Corp., East Pittsburgh, Pa.
Whitlock Mfg. Co., Hartford, Conn.
Wittenmeier Machinery Co., Chicago, Ill.
• Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
• Young Radiator Co., Racine, Wis.
Zallea Brothers & Johnson, Wilmington, Del.

CONDENSERS, WATER DISTRIBUTORS FOR

See Distributors, Water, for Condensers

CONDENSING UNITS

See Compressors

CONDUIT, UNDERGROUND PIPING

• American District Steam Co., North Tonawanda, N. Y.
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Dockstader, Inc., S. E., Washington, D. C.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Johns-Manville, New York, N. Y.
Michigan Pipe Co., Bay City, Mich.
• Porter & Co., Inc., H. W., Newark, N. J.
Ric-wiL Co., Cleveland, O.
• Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Underground Steam Construction Co., Boston, Mass.
Wyckoff & Son Co., A., Elmira, N. Y.

CONNECTIONS, DUCT, FLEXIBLE (ASBESTOS, CANVAS, ETC.)

Canvas Products Co., St. Louis, Mo.
Chicago Metal Hose Corp., Maywood, Ill.
Felters Co., Inc., Boston, Mass.
• Grant Wilson, Inc., Chicago, Ill.
United States Rubber Co., New York, N. Y.
• Wilson, Inc., Grant, Chicago, Ill. (Asbestos)

CONNECTORS, FOR NON-METALLIC DUCT FABRICATION

Acme Steel Co., Chicago, Ill. (Strapping)
• Dravo Corp., Pittsburgh, Pa.
Klomparens Lock-Joint Mfg. Co., Inc., Washington, D. C.
Lumm Co., A. H., Toledo, O.
Sheetlock Co., Chicago, Ill.
United States Rubber Co., New York, N. Y.

CONTROL, FOR INDIRECT WATER HEATERS

Armstrong Heat Control Co., Portland, Ore.
• Barber-Colman Co., Rockford, Ill.
• Bell & Gossett Co., Morton Grove, Ill.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
• Detroit Lubricator Co., Detroit, Mich.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
• Mercoid Corp., The, Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Taco Heaters, Inc., New York, N. Y.
• Thrush & Co., H. A., Peru, Ind.

CONTROLLERS AND STARTERS, MOTOR

Allen-Bradley Co., Milwaukee, Wis.
• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.
B/W Controller Corp., Birmingham, Mich.
Borg-Erickson Corp., Chicago, Ill.
Chase-Shawmet Co., Newberyport, Mass.
Clark Controller Co., Cleveland, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, O.
Electric Machinery Co., Minneapolis, Minn. (Synchronous motor)
General Electric Co., Schenectady, N. Y.
Hart Mfg. Co., Hartford, Conn.
Monitor Controller Co., The, Baltimore, Md.
Reynolds Electric Co., Chicago, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Trumbull Electric Mfg. Co., Plainville, Conn.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
Westinghouse Electric Corp., East Pittsburgh, Pa.
Zenith Electric Co., Chicago, Ill.

CONTROLS, AIR CONDITIONING

See Humidistats; Indicator-Controllers; Operators, Dampers; Operators, Valve; Recorder-Controllers; Regulators; Relays; Switches; Thermostats; Valves, Diaphragm; Valves, Refrigeration; Valves, Solenoid

CONTROLS, DOOR, ELECTRIC EYE (FOR AIR CONDITIONED ROOMS)

Westinghouse Electric Corp., East Pittsburgh, Pa.

CONTROLS, DRAFT, BAROMETRIC

• Barber-Colman Co., Rockford, Ill.
Cole-Sullivan Engineering Co., Minneapolis, Minn.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Hotstream Heater Co., Cleveland, O.
Perfex Corp., Milwaukee, Wis.
Preferred Utilities Mfg. Corp., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Simplex Mfg. Co., Fond du Lac, Wis.

CONTROLS, FIRE PROTECTION SPRINKLER SYSTEMS

• Barber-Colman Co., Rockford, Ill.
• Grinnell Co., Inc., Providence, R. I.
• Mercoid Corp., The, Chicago, Ill.
Rockwood Sprinkler Co., Worcester, Mass.
Synchro-Start Products, Chicago, Ill.
Worner Electronic Devices, Chicago, Ill.

CONTROLS, FLAME FAILURE

Combustion Control Corp., Cambridge, Mass.
• Mettler Co., Lee B., Los Angeles, Calif.
• Webster Engineering Co., Tulsa, Okla.

CONTROLS, HEATING

See Alarms; Humidistats; Indicator-Controllers; Operators, Damper; Operators, Valve; Recorder-Controllers; Regulators; Relays; Switches; Systems, Combustion Control; Systems, Heating; Thermostats; Valves, Balancing, Radiator; Valves, Diaphragm; Valves, Flow Control; Valves, Mixing; Valves, Pressure Reducing and Regulating; Valves, Radiator; Valves, Solenoid

CONTROLS, PUSH-PULL

See Shafts, Flexible, Push-Pull, for Control

CONTROLS, REFRIGERATION

See Humidistats; Operators, Valves; Relays; Switches; Thermostats; Valves, Refrigeration; Valves, Solenoid

CONVECTORS

See Radiation, Convection Type

CONVEYORS, COAL AND ASH

Chain Belt Co., Milwaukee, Wis.
Jeffrey Mfg. Co., Columbus, O.
• La-Del Conveyor & Mfg. Co., New Philadelphia, O.
Link-Belt Co., Chicago, Ill.
• Mercoid Corp., The, Chicago, Ill.
Standard Transmission Equipment Co., Los Angeles, Calif.
• Stephens-Adamson Mfg. Co., Aurora, Ill.

COOLERS, OIL

• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Andale Co., Philadelphia, Pa.
• American District Steam Co., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
• Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., Inc., J. P., Mt. Vernon, Ill.
Downingtown Iron Works, Downingtown, Pa.
Fedders-Quigan Corp., Buffalo, N. Y.
Frank Heaters, Inc., Paterson, N. J.
G & O Mfg. Co., New Haven, Conn.
Griscom-Russell Co., The, New York, N. Y.
Howard Iron Works & Alberger Heater Co., Buffalo, N. Y.
• Modine Mfg. Co., Racine, Wis.
• Murray Mfg. Co., D. J., Wausau, Wis.
National Pipe Bending Co., New Haven, Conn.
• Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Refrigeration Economics Co., Inc., Canton, O.
Rome-Turney Radiator Co., Rome, N. Y.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Struthers Wells Corp., Titusville, Pa.
• Trane Co., The, La Crosse, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Whitlock Mfg. Co., Hartford, Conn.
Winslow Engineering Co., Oakland, Calif.
• Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.
• Young Radiator Co., Racine, Wis.
Zallea Brothers & Johnson, Wilmington, Del.

• Advertisement in this issue. See Index to Advertisers, pages 367-368.

COOLERS, UNIT (FLOOR TYPE)

Not air conditioning units, but floor mounted unit with coil and centrifugal fans without filters, for connection to remote compressor or cold water supply. For air conditioning units see Units, Air Conditioning

• Acme Industries, Inc., Jackson, Mich.
American Blower Corp., Detroit, Mich.
American Coils, Inc., Newark, N. J.
• Baker Ice Machine Co., Inc., Omaha, Neb.
Beacon-Morris Corp., Boston, Mass. (Custom built)
• Buffalo Forge Co., Buffalo, N. Y.
• Bush Mfg. Co., Hartford, Conn.
• Carrier Corp., Syracuse, N. Y.
• Clarage Fan Co., Kalamazoo, Mich.
Conditionaire Unit Co., Chicago, Ill.
• Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer & Hanson, Inc., Los Angeles, Calif.
Economy Equipment Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Howe Ice Machine Co., Chicago, Ill.
• Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
• Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
Manufacturers Fin Coil Co., Chicago, Ill.
• Mario Coil Co., St. Louis, Mo.
• McQuay, Inc., Minneapolis, Minn.
• Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
• Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Richmond Engineering Co., Inc., Richmond, Va.
Schelm Bros., Inc., East Peoria, Ill.
• Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
• Trane Co., The, La Crosse, Wis.
• United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., East Pittsburgh, Pa.
• Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
• Young Radiator Co., Racine, Wis.

COOLERS, UNIT (SUSPENDED TYPE)

Not air conditioning units, but suspended unit with coil and propeller fan, without filters, for connection to remote compressor or cold water supply. For air conditioning units, see Units, Air Conditioning

American Blower Corp., Detroit, Mich.
American Coils, Inc., Newark, N. J.
American Cooling Tower Co., Kansas City, Mo.
• Baker Ice Machine Co., Inc., Omaha, Neb.
Beacon-Morris Corp., Boston, Mass. (Custom built)
Bern's Specialty Mfg. Co., Chicago, Ill.
Betz Corp., Hammond, Ind.
• Buffalo Forge Co., Buffalo, N. Y.
• Bush Mfg. Co., Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.
• Carrier Corp., Syracuse, N. Y.
• Clarage Fan Co., Kalamazoo, Mich.
Conditionaire Unit Co., Chicago, Ill.
• Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer & Hanson, Inc., Los Angeles, Calif.
Fedders-Quigan Corp., Buffalo, N. Y.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Howe Ice Machine Co., Chicago, Ill.
• Ilg Electric Ventilating Co., Chicago, Ill.
• Johnson Fan & Blower Corp., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
• Kennard Corp., St. Louis, Mo.
King Ventilating Co., Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
Manufacturers Fin Coil Co., Chicago, Ill.
• Mario Coil Co., St. Louis, Mo.
• McCord Corp., Detroit, Mich.
• McQuay, Inc., Minneapolis, Minn.
Merchant & Evans Co., Philadelphia, Pa.
• Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
• Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rempe Co., Chicago, Ill.
Richmond Engrg. Co., Inc., Richmond, Va.
Schelm Bros., Inc., East Peoria, Ill.
• Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Super Radiator Corp., Minneapolis, Minn.
• Tenney Engineering, Inc., Newark, N. J.
Thermal Co., Inc., Milwaukee, Wis.
• United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., East Pittsburgh, Pa.
• Wing Mfg. Co., L. J., New York, N. Y.
• Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
• Young Radiator Co., Racine, Wis.

COOLERS, WATER, DRINKING

• Coolstream Corp., The, Brooklyn, N. Y.

COOLING COILS

See Surface, Cooling

COOLING SURFACE

See Surface, Cooling

COOLING TOWERS

See Towers, Cooling

COOLING UNITS

See Units, Air Conditioning; Coolers, Unit

COPPER PIPE

See Pipe, Brass and Copper

COPPER SHEETS

See Sheets, Copper

COPPER TUBE FITTINGS

See Fittings, Copper Tube

COPPER TUBE FITTINGS, FLARED

See Fittings, Copper Tube, Flared

COPPER TUBING

See Tubing, Brass and Copper

CORROSION PREVENTIVES

See Treatment, Steam System, to Inhibit Corrosion; and Treatment, Water, to Inhibit Corrosion

COUNTERS, DUST

Bausch & Lomb Optical Co., Rochester, N. Y.
Elmer & Amend, New York, N. Y.
Service to Industry, West Hartford, Conn.
Willson Products, Inc., Reading, Pa.

COUPLINGS, FLEXIBLE, POWER TRANSMISSION

Ajax Flexible Coupling Co., Westfield, N. Y.
• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Flexible Coupling Co., Erie, Pa.
Blood Brothers Machine Co., Allegan, Mich. (Universal joints)
Boston Gear Wks., Inc., North Quincy, Mass.
Browning Mfg. Co., Inc., Maysville, Ky.
Caldwell Co., W. E., Louisville, Ky.
Certified Flexible Couplings, New York, N. Y.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Congress Die Casting Div., Congress Tool & Die Co., Detroit, Mich.
Continental Diamond Fibre Co., Newark, Del.
Crocker-Wheeler Electric Mfg. Co. Div., Joshua Hendy Iron Works, Ampere, N. J.
De Laval Steam Turbine Co., Trenton, N. J.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Dodge Mfg. Corp., Mishawaka, Ind.
Guardian Utilities Co., Michigan City, Ind.
Jeffrey Mfg. Co., Columbus, O.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Koppers Co., Bartlett Hayward Div., Baltimore, Md.
Link-Belt Co., Indianapolis, Ind.
• Lord Mfg. Co., Erie, Pa.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Medart Co., St. Louis, Mo.
Mercury Clutch Corp., Canton, O.
Moran Flexible Joint Co., Inc., Louisville, Ky.
Morse Chain Co., Ithaca, N. Y.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Poole Foundry & Machine Co., Baltimore, Md.
Ramsey Chain Co., Inc., Albany, N. Y.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
Shallcross Co., Philadelphia, Pa.
Stewart-Rogers, Inc., Philadelphia, Pa.
Stow Mfg. Co., Binghampton, N. Y.
Thermoid Rubber, Div. of Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.
Waldron Corp., John, New Brunswick, N. J.
Westinghouse Electric Corp., East Pittsburgh, Pa.
Whitney Chain & Mfg. Co., The, Hartford, Conn.
Wood's Sons Co., T. B., Chambersburg, Pa.

COUPLINGS, PIPE

Aeroquip Corp., Jackson, Mich.
Alabama Pipe Co., Anniston, Ala. (Cast iron)
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Chase Brass & Copper Co., Waterbury, Conn.
Champion Machine & Forging Co., Cleveland, O.

Clow & Sons, James B., Chicago, Ill.
Colonial Alloys Co., Metals Div., Philadelphia, Pa. (Stainless)
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
• Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Dillon Co., Tulsa, Okla.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Drinkwater, Inc., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
• Grinnell Co., Inc., Providence, R. I.
Gustin Bacon Mfg. Co., Kansas City, Mo.
H. & B. Sales Co., Ltd., Long Beach, Calif. (Swing joint)
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
• Jefferson Union Co., New York, N. Y.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
• Kennedy Valve Mfg. Co., Elmira, N. Y.
King Union Co., Inc., Hillsgrove, R. I.
Malleable Iron Fittings Co., Branford, Conn.
• McAlear Mfg. Co., Chicago, Ill.
• Mueller Brass Co., Port Huron, Mich.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Steel Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Ravena Iron Co., Ravena, N. Y. (Cast iron)
Republic Steel Corp., Cleveland, O.
Rhode Island Fittings Co., Hillsgrove, R. I.
Semler Co., Jeannette, Pa.
Stockham Pipe Fittings Co., Birmingham, Ala.
Stokes Rubber Co., Jos., Trenton, N. J. (Hard rubber)
Superior Railway Products Corp., Pittsburgh, Pa.
Union Metal Works, Chelsea, Mass.
United States Stoneware Co., New York, N. Y.
Victaulic Co. of America, New York, N. Y.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
• Watson-Stillman Co., Roselle, N. J.
Weatherhead Co., Cleveland, O.
Wheeling Machine Products Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
• Youngstown Sheet & Tube Co., Youngstown, O.

COUPLINGS, PIPE, DETACHABLE

Aeroquip Corp., Jackson, Mich.
Drinkwater, Inc., Chicago, Ill.
Packless Metal Products Corp., New Rochelle, N. Y.
Victaulic Co. of America, New York, N. Y.
Wiggins Oil Tool Co., Inc., E. B., Los Angeles, Calif.

CUT-OFFS, LOW WATER, HEATING BOILER

B/W Controller Corp., Birmingham, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
• General Controls Co., Glendale, Calif.
• Johnson Corp., Three Rivers, Mich.
• Kieley & Mueller, Inc., North Bergen, N. J.
• Maid-O'-Mist, Inc., Chicago, Ill.
• McAlear Mfg. Co., Chicago, Ill.
• McDonnell & Miller, Chicago, Ill.
• Mercoid Corp., The, Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Penn Electric Switch Co., Goshen, Ind.
• Schaub Engineering Co., Fred H., Chicago, Ill.
Watts Regulator Co., Lawrence, Mass.
• Webster & Co., Warren, Camden, N. J.
Wright-Austin Co., Detroit, Mich.

CUTTERS, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Atkins & Co., E. C., Indianapolis, Ind.
Barnes Tool Co., The, New Haven, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Bernz Co., Inc., Otto, Rochester, N. Y.
C-B Tool Co., Lancaster, Pa.
Crown Die & Tool Co., Chicago, Ill.
Erie Tool Works, Erie, Pa.
Everhot Products Co., Chicago, Ill.
Hollands Mfg. Co., Erie, Pa.
International Nutvp Tool Co., Oswego, N. Y.
National Machine Wks., Chicago, Ill.
Nye Tool & Machine Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
• Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Toledo Pipe Threading Machine Co., Toledo, O.
Trimont Mfg. Co., Boston, Mass.
Wallace Supplies Mfg. Co., Chicago, Ill.

CUTTERS, TUBING

Armstrong Mfg. Co., Bridgeport, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Bernz Co., Inc., Otto, Rochester, N. Y.
• Bonney Forge & Tool Works, Allentown, Pa.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Imperial Brass Mfg. Co., Chicago, Ill.
• Mueller Brass Co., Port Huron, Mich.
Nye Tool & Machine Co., Chicago, Ill.
Parker Appliance Co., Cleveland, O.
Perfection Refrigeration Parts Co., Harvey, Ill.
• Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-On Tools Corp., Kenosha, Wis.
Trimont Mfg. Co., Boston, Mass.
Wallace Supplies Mfg. Co., Chicago, Ill.
Weatherhead Co., Cleveland, O.

DAMPER OPERATORS

See Operators, Damper

DAMPER REGULATORS

See Regulators, Damper Sets

DAMPERS, DUCT, MANUALLY OPERATED

Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Adams Co., The, Dubuque, Ia.
Air Conditioning Products Co., Detroit, Mich.
Air Control Products, Inc., Coopersville, Mich.
Belanger Fan & Blower Co., Detroit, Mich.
Corbman Bros., Inc., Philadelphia, Pa.
Elgo Shutter & Mfg. Co., Detroit, Mich.
Excelsior Steel Furnace Co., Chicago, Ill.
Goetti Bros. Metal Prod. Co., Phoenix, Ariz.
Jacobs Co., B. & J., Cincinnati, O.
Kerentoff, G. L., Cincinnati, O.
Martens & Stormoen, Boston, Mass.
Meyer Mfg. Co., Detroit, Mich.
Ohio Products Co., Cleveland, O.
Richmond Radiator Co., Gas Products Div., Uniontown, Pa.
Salina Metal Products Co., Salina, Kan.
Sioux Steel Co., Sioux Falls, S. D.
Standard Furnace & Supply Co., Omaha, Neb.
United States Register Co., Battle Creek, Mich.
Young Regulator Co., Cleveland, O.

DAMPERS, DUCT, REMOTE CONTROLLED

Air Conditioning Products Co., Detroit, Mich.
American Warming & Ventilating Co., Toledo, O.
• Autempco Corp., New York, N. Y.
• Barber-Colman Co., Rockford, Ill.
Belanger Fan & Blower Co., Detroit, Mich.
Brooke Engineering Co., Inc., Philadelphia, Pa.
• Johnson Service Co., Milwaukee, Wis.
Meyer Mfg. Co., Detroit, Mich.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Penn Electric Switch Co., Goshen, Ind.
• Powers Regulator Co., Chicago, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.
Stuart Co., W. W., Des Moines, Ia.
Thermix Engineering Co., Greenwich, Conn.
• Tuttle & Bailey, Inc., New Britain, Conn.
Vapor Car Heating Co., Inc., Chicago, Ill.
Young Regulator Co., Cleveland, O.

DEAERATORS

Blackburn-Smith Mfg. Co., Hoboken, N. J.
Cochrane Corp., Philadelphia, Pa.
Croll-Reynolds Engrg. Co., Inc., New York, N. Y.
Elliott Co., Jeannette, Pa.
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Heat Transfer Products, Inc., Carbondale, Pa.
Hoppes Mfg. Co., Springfield, O.
Permutit Co., New York, N. Y.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Sims Co, Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
Swartwout Co., Cleveland, O.
Whitlock Mfg. Co., Hartford, Conn.
Worthington Pump & Machinery Corp., Harrison, N. J.

DEEP WELL PUMPS

See Pumps, Deep Well

DEHUMIDIFIERS, ABSORPTION AND ADSORPTION

• Air & Refrigeration Corp., New York, N. Y.
Aqua-Sorb Co., East Orange, N. J.
Bryant Heater Co., The, Cleveland, O. (Silica gel)
Carbide and Carbon Chemicals Corp., New York, N. Y. (Triethylene-Glycol)
Cargocaire Engineering Corp., New York, N. Y. (for ships)
• Carrier Corp., Syracuse, N. Y.
Davison Chemical Corp., The, Baltimore, Md.
Drying Systems, Inc., Chicago, Ill.
Floridin Co., Warren, Pa.
Kaufman Co., H. J., Detroit, Mich.
Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.
• Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Research Corp., New York, N. Y.
Rogers Diesel & Aircraft Corp., New York, N. Y.
Solvay Sales Corp., New York, N. Y.
Somers, Inc., Detroit, Mich.
• Surface Combustion Corp., Toledo, O.
Tamms Silica Co., Chicago, Ill.

DEHUMIDIFYING UNITS

See Units, Air Conditioning: Dehumidifiers, Absorption and Adsorption

• Advertisement in this issue. See Index to Advertisers, pages 367-368.

DEHYDRANT AND ACID NEUTRALIZER, FOR REFRIGERATING SYSTEMS

American Injector Co., Detroit, Mich.
Davison Chemical Corp., The, Baltimore, Md.
Highside Chemicals Co., Newark, N. J.
Weatherhead Co., Cleveland, O.

DEHYDRATORS, REFRIGERANT

• Aluminum Co. of America, Pittsburgh, Pa.
American Injector Co., Detroit, Mich.
• Automatic Products Co., Milwaukee, Wis.
Davison Chemical Corp., The, Baltimore, Md.
Floridin Co., Warren, Pa.
Gasflux Co., Mansfield, O.
• Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Joliet Chemicals, Inc., Joliet, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Weatherhead Co., Cleveland, O.
• Western Thermal Equipment Co., Los Angeles, Calif.

DESTROYERS, SOOT, CHEMICAL

Desolvo Co., The, Pittsburgh, Pa.
Diamond Chemical Products, New York, N. Y.
Healy Ruff Co., St. Paul, Minn.
Hercules Chemical Co., Inc., New York, N. Y.
MacDeramid Chemical Co., Bristol, Conn.
Tamms Silica Co., Chicago, Ill.
Vinco Co., Inc., The, New York, N. Y.

DESUPERHEATERS, STEAM

Babcock & Wilcox Co., New York, N. Y.
Brown Fintube Co., The, Elyria, O.
Dri-Steam Products, Inc., New York, N. Y.
Edge Moor Iron Works, Inc., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Northern Equipment Co., Erie, Pa.
• Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Whitlock Mfg. Co., Hartford, Conn.

DETECTORS, LEAK, REFRIGERANT

Bernz Co., Inc., Otto, Rochester, N. Y.
Highside Chemicals Co., Newark, N. J.
Imperial Brass Mfg. Co., Chicago, Ill.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
• Schaub Engineering Co., Fred H., Chicago, Ill. (Leak alarm)
• Turco Products, Inc., Los Angeles, Calif.
Turner Brass Wks., Sycamore, Ill.
• Western Thermal Equipment Co., Los Angeles, Calif.

DIAPHRAGM VALVES

See Valves, Diaphragm

DIESEL ENGINES

See Engines, Diesel, for Fan, Pump and Compressor Drives

DIFFUSERS, AIR, HIGH VELOCITY

See also Grilles; Panels, Perforated, for Air Diffusion; Registers

• Air Devices, Inc., New York, N. Y.
• Air & Refrigeration Corp., New York, N. Y.
• Anemostat Corp. of America, New York, N. Y.
• Barber-Colman Co., Rockford, Ill.
• Connor Engineering Corp., W. B., New York, N. Y.
Demuth & Sons, Charles, Mineola, L. I., N. Y.
• Dynamic Air Engineering, Inc., Los Angeles, Calif.
Guth Co., Edwin F., St. Louis, Mo.
• Tuttle & Bailey, Inc., New Britain, Conn.
• Waterloo Register Div. of Associated Manufacturers, Inc., Waterloo, Ia.
Wilster Air Devices, Inc., Cleveland, O.

DIFFUSION, AIR

See Panels, Perforated, for Air Diffusion

DISTRIBUTORS, WATER, FOR CONDENSERS

• Martocello & Co., Jos. A., Philadelphia, Pa.

DOOR CONTROLS

See Controls, Door, Electric Eye

DOORS AND PANELS, ACCESS

American Foundry & Furnace Co., Bloomington, Ill.
American Sheet Metal Works, New Orleans, La.
• Auer Register Co., Cleveland, O.
Biersach & Niedermeyer Co., Milwaukee, Wis.
• Clarage Fan Co., Kalamazoo, Mich.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Decatur Iron & Steel Co., Decatur, Ala.
Falstrom Co., Passaic, N. J.
Kirk & Blum Mfg. Co., Cincinnati, O.
Lockjoint Wood Products Co., Wichita, Kan.
Milcor Steel Co., Milwaukee, Wis.
Rock Island Register Co., Rock Island, Ill.
Technical Ply-Woods, Chicago, Ill.
Truscon Steel Co., Youngstown, O.
• Tuttle & Bailey, Inc., New Britain, Conn.
Way Loctor Access Panel Co., Boston, Mass.
Western Wire & Iron Works, Inc., Chicago, Ill. (Metal)

DRAFT CONTROL

See Controls, Draft, Barometric; Regulators, Draft, Combustion

DRAFT GAGES

See Gages, Indicating, Draft

DRAFT RECORDERS

See Recorders, Draft

DRAFT REGULATORS

See Controls, Draft, Barometric; Regulators, Draft, Combustion

DRAWING TEMPLATES, PIPING

See Templates, Drawing, Piping

DRILLS, ELECTRIC, PORTABLE

Albertson & Co., Inc., Sioux City, Ia.
• Black & Decker Mfg. Co., Towson, Md.
Chicago Pneumatic Tool Co., New York, N. Y.
Cincinnati Electrical Tool Co., The, Cincinnati, O.
Clark, Jr., Electric Co., Jas., Louisville, Ky.
Duro Metal Products Co., Chicago, Ill.
Independent Pneumatic Tool Co., Chicago, Ill.
Keller Tool Co., Grand Haven, Mich.
Mall Tool Co., Chicago, Ill.
Millers Falls Co., Greenfield, Mass.
Misener Mfg. Co., Inc., Syracuse, N. Y.
Paramount Products Co., New York, N. Y.
Signal Electric Mfg. Co., Menominee, Mich.
Skilsaw, Inc., Chicago, Ill.
Snap-On Tools Corp., Kenosha, Wis.
Speedway Mfg. Co., Chicago (Cicero), Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Syntron Co., Homer City, Pa.
U. S. Electrical Tool Co., Cincinnati, O.
Van Dorn Electric Tool Co., Towson, Md.
Willy's Carbide Tool Co., Detroit, Mich.
Wodack Electric Tool Corp., Chicago, Ill.
York Electric & Machine Co., York, Pa.

DRIVES, CHAIN

Caldwell Co., W. E., Louisville, Ky.
Chain Belt Co., Milwaukee, Wis.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Horton Mfg. Co., Minneapolis, Minn.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Indianapolis, Ind.
Medart Co., St. Louis, Mo.
Morse Chain Co., Ithaca, N. Y.
Ramsey Chain Co., Inc., Albany, N. Y.
Whitney Chain & Mfg. Co., The, Hartford, Conn.

DRIVES, FLAT BELT

See also Belting, Leather and Belting, Rubber

American Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Browning Mfg. Co., Inc., Maysville, Ky.
Caldwell Co., W. E., Louisville, Ky.
Chicago Belting Co., Chicago, Ill.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Continental Rubber Wks., Erie, Pa.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Gates Rubber Co., The, Denver, Colo.
Horton Mfg. Co., Minneapolis, Minn.
Medart Co., St. Louis, Mo.
Remco Products Corp., York, Pa.
• Rhoads & Sons, J. E., Philadelphia, Pa.
Rockwood Mfg. Co., Indianapolis, Ind.
Williams & Son, I. B., Dover, N. H.
Wood's Sons Co., T. B., Chambersburg, Pa.

DRIVES, V BELT

• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Browning Mfg. Co., Inc., Maysville, Ky.
Chicago Belting Co., Chicago, Ill.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Congress Die Casting Div., Congress Tool & Die Co., Detroit, Mich.
Continental Rubber Wks., Erie, Pa.
Dayton Rubber Mfg. Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Gates Rubber Co., Denver, Colo.
Goldens' Foundry & Machine Co., Columbus, Ga.
Goodrich Co., B. F., Akron, O.
Horton Mfg. Co., Minneapolis, Minn.
Ideal Commutator Dresser Co., Sycamore, Ill.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Medart Co., St. Louis, Mo.
Pyott Foundry & Machine Co., Chicago, Ill.
Remco Products Corp., York, Pa.
Rockwood Mfg. Co., Indianapolis, Ind.
Thermoid Rubber, Div. of Thermoid Co., Trenton, N. J.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

DRIVES, VARIABLE SPEED

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical; Reducers, Speed; Pulleys and Sheaves, for Belt Drives

• Advertisement in this issue. See Index to Advertisers, pages 367-368.

DRYERS, INDUSTRIAL (COMPARTMENT, TUNNEL, CONVEYOR, VACUUM, SPRAY, ROTARY, ETC.)

Bowen Research Corp., Garwood, N. J.
Buffalo Foundry & Machine Co., Buffalo, N. Y.
Campbell Heating Co., Des Moines, Ia.
Despatch Oven Co., Minneapolis, Minn.
Devine Mfg. Co., Inc., J. P., Mt. Vernon, Ill.
Drying Systems, Inc., Chicago, Ill.
Hersey Mfg. Co., South Boston, Mass.
Hunter Machine Co., James, North Adams, Mass.
Instant Drying Corp., New York, N. Y.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Indianapolis, Ind.
Louisville Drying Machinery Co., Louisville, Ky.
Peters-Dalton, Inc., Detroit, Mich.
Proctor & Schwartz, Inc., Philadelphia, Pa.
Raymond Pulverizer Div., Combustion Engineering Co., Chicago, Ill.
Ross Engineering Corp., J. O., New York, N. Y.
Stokes Machine Co., F. J., Philadelphia, Pa.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Boston, Mass.
Western Precipitation Corp., Los Angeles, Calif.

DUAL THERMOSTATS

See Thermostats, Two Temperature or Dual

DUCT CONNECTIONS

See Connections, Duct, Flexible; Connectors for Non-Metallic Duct Fabrication

DUCT HEATERS

See Heaters, Duct

DUCT INSULATION

See Insulation, Duct

DUCT THERMOSTATS

See Thermostats, Duct Type

DUCT TURNING VANES

See Vanes, Duct Turning, Prefabricated

DUCTS AND DUCT FITTINGS, PREFABRICATED, METALLIC

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
American Ventilating Hose Co., New York, N. Y.
Champion Furnace Pipe Co., Peoria, Ill.
Chandler Co., Cedar Rapids, Ia.
Char-Gale Mfg. Co., Minneapolis, Minn.
Chicago Furnace Supply Co., Chicago, Ill.
Chicago Metal Hose Corp., Maywood, Ill.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
• Clayton & Lambert Mfg. Co., Middletown Div., Middletown, O.
Corbman Bros., Inc., Philadelphia, Pa.
Excelsior Steel Furnace Co., Chicago, Ill.
Gehri Co., Tacoma, Wash.
General Heating Products Co., Minneapolis, Minn.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Gray Metal Products, Inc., Rochester, N. Y.
Henry Furnace Co., The, Medina, O.
Howes-Woods Co., Cambridge, Mass.
International Heater Co., Utica, N. Y.
Jacobs Co., B. & J., Cincinnati, O.
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Milwaukee, Wis.
Moncrief Furnace Co., Atlanta, Ga.
• Mueller Furnace Co., L. J., Milwaukee, Wis.
Richmond Radiator Co., Gas Products Div., Uniontown, Pa.
Schecter Brothers Co., Philadelphia, Pa.
Sioux Steel Co., Sioux Falls, S. D.
Smith-Raymond Co., Columbus, Ga.
United States Register Co., Battle Creek, Mich.
Van Noorden Co., E., Boston, Mass.
Williamson Heater Co., Cincinnati, O.

DUCTS AND DUCT FITTINGS, PREFABRICATED, NON-METALLIC

Carey Mfg. Co., Philip, Cincinnati, O.
du Pont de Nemours & Co., E. I., Fabrics & Finishes Dept., Wilmington, Del.
Jacobs Co., B. & J., Cincinnati, O.
Knight, Maurice A., Akron, O. (acid fumes)
Smith-Raymond Co., Columbus, Ga.
Standard Furnace & Supply Co., Omaha, Neb.
United States Rubber Co., New York, N. Y.
Warner Bros. Co., Spiratube Div., Bridgeport, Conn.
Wiremold Co., The, Hartford, Conn.

DUST COLLECTORS

See Collectors, Dust

DUST COUNTERS

See Counters, Dust

ECONOMIZERS, FUEL

Babcock & Wilcox Co., New York, N. Y.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Combustion Engineering Co., Inc., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Fuel Savers, Inc., Harrisburg, Pa.
Green Fuel Economizer Co., Beacon, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Zallea Brothers & Johnson, Wilmington, Del.

EJECTORS, SEWAGE

American-Marsh Pumps, Inc., Battle Creek, Mich.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Works Co., Columbus, O.
Economy Pumps, Inc., Hamilton, O.
• Nash Engineering Co., South Norwalk, Conn.
Penberthy Injector Co., Detroit, Mich.
Quimby Pump Div., H. K. Porter Co., Inc., Newark, N. J.
Schutte & Koerting Co., Philadelphia, Pa.
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Inc., Buffalo, N. Y.
Weil Pump Co., Chicago, Ill.
Yeomans Bros. Co., Chicago, Ill.

ELBOWS, BALANCING, FOR HOT WATER HEATING SYSTEMS

Sarcotherm Controls, Inc., New York, N. Y.

ELECTRIC AIR CLEANERS

See Cleaners, Air, Electrical

ELECTRIC DRILLS

See Drills, Electric, Portable

ELECTRIC MOTORS

See Motors, Electric

ELECTRIC SHEARS

See Shears, Electric, Portable

ELECTRIC UNIT HEATERS

See Heaters, Unit, Electric Heating Element

ELECTRIC WATER HEATERS

See Heaters, Water, Electric

ELECTRODES, ARC WELDING

• Air Reduction Sales Co., New York, N. Y.
Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Allied Weld-Craft, Inc., Indianapolis, Ind.
• Aluminum Co. of America, Pittsburgh, Pa.
American Agile Corp., Cleveland, O.
• American Brass Co., Waterbury, Conn.
American Steel & Wire Co., Cleveland, O.
Arcos Corp., Philadelphia, Pa.
Atlantic Steel Co., Atlanta, Ga.
Carlin Co., Anthony, Cleveland, O.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Steel & Wire Co., Chicago, Ill.
Electric Arc, Inc., Newark, N. J.
Eutectic Welding Alloys Co., New York, N. Y.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., Milwaukee, Wis.
Hobart Bros. Co., Troy, O.
Hollup Corp., Div. of National Cylinder Gas Co., Chicago, Ill.
Laclede Steel Co., St. Louis, Mo.
Lincoln Electric Co., Cleveland, O.
Marquette Mfg. Co., Minneapolis, Minn.
Maurath, Inc., Cleveland, O.
McKay Co., York, Pa.
Metal & Thermit Corp., New York, N. Y.
National Carbon Co., New York, N. Y.
Page Steel & Wire Division of American Chain & Cable Co., Inc., Monessen, Pa.
Sight Feed Generator Co., Richmond, Ind.
Torchweld Equipment Div., National Cylinder Gas Co., Chicago, Ill.
Trindl Products, Ltd., Chicago, Ill.
Universal Power Corp., Cleveland, O.
Welding Apparatus Co., Chicago, Ill.
Westinghouse Electric Corp., East Pittsburgh, Pa.
Wilson Welder & Metals Co., Inc., New York, N. Y.

ELIMINATORS, AIR, FOR HEATING AND PIPING SYSTEMS

• Anderson Co., V. D., The, Cleveland, O.
• Armstrong Machine Works, Three Rivers, Mich.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
• Bell & Gossett Co., Morton Grove, Ill.
• Dole Valve Co., The, Chicago, Ill.
Gorton Heating Corp., Cranford, N. J.
• Hoffman Specialty Co., Indianapolis, Ind.
• Illinois Engineering Co., Chicago, Ill.
• Maid-O'-Mist, Inc., Chicago, Ill.
Marsh Corp., Jas. P., Chicago, Ill.
• McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Mouat Vapor Heating Co., The, Cleveland, O.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
• Sterling, Inc., Milwaukee, Wis.
Triplex Heating Specialty Co., Peru, Ind.
Vapor Specialty Co., New York, N. Y.
Wright-Austin Co., Detroit, Mich.

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ENAMELS AND LACQUERS

Acme White Lead & Color Works, Detroit, Mich.
Acorn Refining Co., Cleveland, O.
American-Marietta Co., Chicago, Ill.
Baer Bros., New York, N. Y.
Blue Ridge Talc Co., Inc., Henry, Va.
Cordo Chemical Co., Norwalk, Conn.
Debevoise Co., The, Brooklyn, N. Y.
Detroit Graphite Co., Detroit, Mich.
Devoe & Raynolds Co., Inc., New York, N. Y.
Dragert Co., Inc., C. H., Brooklyn, N. Y.
du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept., Wilmington, Del.
Ferro-Enamel Corp., Liquid Plastics Div., Cleveland, O.
Glidden Co., Cleveland, O.
Hague & Co., Alfred, Brooklyn, N. Y.
Hilo Varnish Corp., Brooklyn, N. Y.
Inter-Coastal Paint Corp., East St. Louis, Ill.
Krehbiel Co., J. H., Chicago, Ill.
Maas & Waldstein Co., Newark, N. J.
O'Brien Varnish Co., South Bend, Ind.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Quigley Co., Inc., New York, N. Y.
Roxalin Flexible Finishes, Inc., Elizabeth, N. J.
Sanvin Chemical Products Co., Moline, Ill.
Sherwin-Williams Co., The, Cleveland, O.
Sonneborn Sons, Inc., L., New York, N. Y.
Thompson & Co., Pittsburgh, Pa.
Tropical Paint & Oil Co., Cleveland, O.
U. S. Gutta Percha Paint Co., Providence, R. I.
Valles Dove-Hermiston Corp., Westfield, N. J.
Wattenamel Co., Summit, Ill.
Wilbur & Williams Co., Boston, Mass.
Wilhelm Co., A., Reading, Pa.
Zapon Div., Atlas Powder Co., North Chicago, Ill.

ENGINES, DIESEL, FOR FAN, PUMP AND COMPRESSOR DRIVES

American Locomotive Co., Auburn, N. Y.
Anderson Engine & Foundry Co., Anderson, Ind.
Baldwin De La Vergne Sales Corp., Philadelphia, Pa.
Bardco Mfg. & Sales Co., Los Angeles, Calif.
Buda Co., Harvey, Ill.
Caterpillar Tractor Co., Peoria, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Fairbanks, Morse & Co., Chicago, Ill.
General Motors Corp., Detroit, Mich.
Hill Diesel Engine Co., Lansing, Mich.
Ingersoll-Rand Co., New York, N. Y.
Waukesha Motor Co., Waukesha, Wis.
Witte Engine Works, Div. of Oil Well Supply Co., Kansas City, Mo.
Worthington Pump & Machinery Corp., Harrison, N. J.

ENGINES, GAS, FOR FAN, PUMP AND COMPRESSOR DRIVES

Bardco Mfg. & Sales Co., Los Angeles, Calif.
Buda Co., Harvey, Ill.
Caterpillar Tractor Co., Peoria, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Continental Motors Corp., Detroit, Mich.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Fairbanks, Morse & Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
Universal Motor Co., Oshkosh, Wis.
Waukesha Motor Co., Waukesha, Wis.
Williamsport Engine & Machine Co., Williamsport, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

ENGINES, STEAM, FOR FAN, PUMP AND COMPRESSOR DRIVES

Ames Iron Wks., Div. of Pierce, Butler Radiator Corp., Oswego, N. Y.
Frick Co., Waynesboro, Pa.
Harrisburg Machinery Corp., Harrisburg, Pa.
Morris Machine Wks., Baldwinsville, N. Y.
Skinner Engine Co., Erie, Pa.
Troy Engine & Machine Co., Troy, Pa.
Vilter Mfg. Co., Milwaukee, Wis.

EQUIPMENT, BALANCING

Bear Mfg. Co., Industrial Div., Rock Island, Ill.
Gisholt Machine Co., Madison, Wis.

EVAPORATIVE CONDENSERS

See Condensers, Refrigerating, Evaporative

EXCHANGERS, HEAT

• American District Steam Co., North Tonawanda, N. Y.
Babcock & Wilcox Co., New York, N. Y.
Beacon-Morris Corp., Boston, Mass.
• Bell & Gossett Co., Morton Grove, Ill.
• Bird-White Co., Chicago, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The Elyria, O.
Buffalo Tank Corp., Dunellen, N. J.
• Bush Mfg. Co., Hartford, Conn.
Corning Glass Works, Corning, N. Y.
Downingtown Iron Works, Downingtown, Pa.
Foster Wheeler Corp., New York, N. Y.
Frank Heaters, Inc., Paterson, N. J.
Graham Mfg. Co., Inc., New York, N. Y.
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Griscom-Russell Co., The, New York, N. Y.
Heat Transfer Products, Inc., Carbondale, Pa.
Howard Iron Works & Alberger Heater Co., Buffalo, N. Y.
Imperial Brass Mfg. Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
Kellogg Co., M. W., The, New York, N. Y.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
• McQuay, Inc., Minneapolis, Minn.
• Modine Mfg. Co., Racine, Wis.
• Mueller Brass Co., Port Huron, Mich.
• Murray Mfg. Co., D. J., Wausau, Wis.
National Carbon Co., New York, N. Y.
• National Radiator Co., The, Johnstown, Pa.
Oiljack Mfg. Co., Inc., Montclaire, N. J.
Parker Appliance Co., The, Cleveland, O.
• Patterson-Kelley Co., Inc., East Stroudsburg, Pa.
• Peerless of America, Inc., Chicago, Ill.
Phillips Cooling Tower Co., Inc., New York, N. Y.
• Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Quaker City Iron Works, Philadelphia, Pa.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Roessing Mfg. Co., Pittsburgh, Pa.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
• Schaub Engineering Co., Fred H., Chicago, Ill.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Stout & Sons, David, St. Louis, Mo.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Thermal Industries, Indio, Calif.
• Trane Co., The, LaCrosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
Vapor Car Heating Co., Inc., Chicago, Ill.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Waterfilm Boilers, Inc., Jersey City, N. J.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Whitlock Mfg. Co., Hartford, Conn.
Winslow Engineering Co., Oakland, Calif.
Worthington Pump & Machinery Corp., Harrison, N. J.
York Corp., York, Pa.
• Young Radiator Co., Racine, Wis.
Zallea Brothers & Johnson, Wilmington, Del.

EXCHANGERS, HEAT, REFRIGERANT SUCTION LINE

• Acme Industries, Inc., Jackson, Mich.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Downingtown Iron Works, Downingtown, Pa.
Flori Pipe Co., The, St. Louis, Mo.
• Peerless of America, Inc., Chicago, Ill.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
• Swan Engineering Co., Inc., Bloomfield, N. J.
Temprite Products Corp., Detroit, Mich.
• Young Radiator Co., Racine, Wis.
Zallea Brothers & Johnson, Wilmington, Del.

EXHAUST HEADS

See Heads, Exhaust, for Pipe Lines

EXHAUSTERS, WELDING FUME

Aladdin Heating Corp., Oakland, Calif.
American Machine Products Co., Marshalltown, Ia.
Belanger Fan & Blower Co., Detroit, Mich.
Champion Blower & Forge Co., Lancaster, Pa.
• Chelsea Fan & Blower Co., Irvington, N. J.
Chicago Pneumatic Tool Co., New York, N. Y.
Coppus Engineering Corp., Worcester, Mass.
Day Co., The, Minneapolis, Minn.
Despatch Oven Co., Minneapolis, Minn.
• Dynamic Air Engineering, Inc., Los Angeles, Calif.
• General Blower Co., Morton Grove, Ill.
Kirk & Blum Mfg. Co., Cincinnati, O.
Klee Co., Geo. B., Cincinnati, O.
• Power Engineering Co., Chicago, Ill.
Ruemelin Mfg. Co., Milwaukee, Wis.
Sawyer Electrical Mfg. Co., Los Angeles, Calif.
Torit Mfg. Co., St. Paul, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Westinghouse Electric Corp., Cleveland, O.
Whiting Corp., Harvey, Ill.
Wind-Way Fan & Ventilator Co., New Orleans, La.

EXPANSION BENDS

See Bends, Expansion

EXPANSION BOLTS

See Bolts, Expansion

EXPANSION JOINTS

See Joints, Pipe, Expansion

EXPANSION TANKS

See Tanks, Expansion, for Hot Water Heating Systems

EXPANSION VALVES

See Valves, Refrigeration

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EXTRACTORS, PIPE

Kopperman & Sons, Joseph, Philadelphia, Pa.
Reps Tool Co., Inc., New York, N. Y.
● Ridge Tool Co., Elyria, O.

FABRICATED PIPING

See Bends; Headers; Joints, etc.

FABRICATORS, PIPE

See Headers, Welded; and Coils, Pipe

FAN BALANCING EQUIPMENT

See Equipment, Balancing

FAN BASES

See Bases and Pads, Vibration Isolating

FAN BLADES

See Blades, Propeller Fan

FAN HOUSINGS

See Housings, Fan, Centrifugal

FANS, AXIAL FLOW, PRESSURE TYPE

Bahnson Co., Winston-Salem, N. C.
● Buffalo Forge Co., Buffalo, N. Y.
Buffalo Turbine Corp., Buffalo, N. Y.
Caldwell Co., Wm. J., Washington, D. C.
● Chelsea Products, Inc., Irvington, N. J.
● De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
● Dynamic Air Engineering, Inc., Los Angeles, Calif.
● Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
● La-Del Conveyor Co., New Philadelphia, O.
● Power Engineering Co., Chicago, Ill.
Propellair, Inc., Springfield, O.
● South Bend Air Products Corp., South Bend, Ind.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
● Wing Mfg. Co., L. J., New York, N. Y.

FANS, CENTRIFUGAL

Advance Aluminum Castings Corp., Chicago, Ill.
Advance Fan & Blower Co., Detroit, Mich.
Air Control Products, Inc., Coopersville, Mich.
Air Controls, Inc., Cleveland, O.
Aladdin Heating Corp., Oakland, Calif.
Allen Corp., Detroit, Mich.
American Blower Corp., Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Ames Co., W. R., San Francisco, Calif.
Ballantyne Co., Omaha, Neb.
Bayley Blower Co., Milwaukee, Wis.
Beckett & Co., Thomas, Dallas, Tex.
Bern's Specialty Mfg. Co., Chicago, Ill.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Blower Application Co., Milwaukee, Wis.
Brundage Co., The, Kalamazoo, Mich.
● Buffalo Forge Co., Buffalo, N. Y.
Caldwell Co., Wm. J., Washington, D. C.
Campbell Heating Co., Des Moines, Ia.
Campbell Heating Co., E. K., Kansas City, Mo.
● Carrier Corp., Syracuse, N. Y.
Century Fan & Ventilator Co., New York, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
● Chelsea Products, Inc., Irvington, N. J.
● Clarage Fan Co., Kalamazoo, Mich.
Coppus Engineering Corp., Worcester, Mass.
Day Co., The, Minneapolis, Minn.
Despatch Oven Co., Minneapolis, Minn.
Diehl Mfg. Co., Finderne Plant, Somerville, N. J.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Eclipse Fuel Engineering Co., Rockford, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Essick Mfg. Co., Los Angeles, Calif.
Garden City Fan Co., Chicago, Ill.
General Blower Co., Inc., Philadelpha, Pa.
● General Blower Co., Morton Grove, Ill.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids Mich.
Grand Rapids Die & Tool Co., Grand Rapids, Mich.
Hastings Air Conditioning Co., Hastings, Neb.
● Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
● Ilg Electric Ventilating Co., Chicago, Ill.
Indiana Fan Company, Indianapolis, Ind.
International Sales Co., San Francisco, Calif.
● Jackson & Church Co., Saginaw, Mich.
Jaden Mfg. Co., Hastings, Neb.
Jeffrey Mfg. Co., Columbus, O.
● Johnson Fan & Blower Corp., Chicago, Ill.
King Ventilating Co., Owatonna, Minn.
L-R Mfg. Co., Blower Div., Torrington, Conn.
● Lau Blower Co., Dayton, O.
Lehigh Fan & Blower Co., Allentown, Pa
Leinweber Fan & Blower Co., Chicago, Ill.
Magirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Martin Fan & Blower Co., Chicago, Ill.
Montag Stove & Furnace Wks., Portland, Ore.
Morrison Products, Inc., Cleveland, O.
Mountain States Equipment Co., Denver, Colo.
● Mueller Furnace Co., L. J., Milwaukee, Wis.
National Engineering & Mfg. Co., Kansas City, Mo.
National Mfg. & Engineering Co., Detroit, Mich.
Nelson Corp., Herman, Moline, Ill.
New York Blower Co., Chicago, Ill.
Niagara Blower Co., New York, N. Y.
Northern Blower Co., Cleveland, O.
Northwest Foundry & Furnace Co., Portland, Ore.
Palmer Mfg. Co., Phoenix, Ariz.
Peerless Electric Co., Warren, O.
Phelps Mfg. Co., Little Rock, Ark.
● Power Engineering Co., Chicago, Ill.
Prat-Daniel Corp., Port Chester, N. Y.
Reynolds Mfg. Co., The, Grand Rapids, Mich.
Royal Air Conditioning Equipment Co., Alhambra, Calif.
Schelm Bros., Inc., East Peoria, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Semco Mfg. Co., Nashville, Tenn.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
● Trane Co., The, La Crosse, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Viking Air Conditioning Corp., Cleveland, O.
Western Blower Co., Seattle, Wash.
● Wing Mfg. Co., L. J., New York, N. Y.

FANS, PROPELLER

Aerovent Fan Co, Piqua, O.
Air Controls, Inc., Cleveland, O.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
● Airtherm Mfg. Co., St. Louis, Mo.
Allen Corp., Detroit, Mich.
American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
American Metal Products Co., Fort Worth, Tex.
Arex Co., Chicago, Ill.
Bahnson Co., Winston-Salem, N. C.
Bayley Blower Co., Milwaukee, Wis.
Beckett & Co., Thomas, Dallas, Tex.
Belanger Fan & Blower Co., Detroit, Mich.
Belco Exhaust Fan Mfg. Co., St. Louis, Mo.
Bern's Specialty Mfg. Co., Chicago, Ill.
● Bishop & Babcock Mfg. Co., Cleveland, O.
● Buffalo Forge Co., Buffalo, N. Y.
C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
Caldwell Co., Wm. J., Washington, D. C.
Campbell Heating Co., E. K., Kansas City, Mo.
Century Fan & Ventilator Co., New York, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
● Chelsea Products, Inc., Irvington, N. J.
Circulators & Devices Mfg. Corp., New York, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Coppus Engineering Corp., Worcester, Mass.
Dallas Engineering Co., Inc., Dallas, Tex.
● De Bothezat Fans Div., American Machine & Metals, Inc., New York, N. Y.
Diehl Mfg. Co., Somerville, N. J.
Dual Air Fan Co., Chicago, Ill.
● Dynamic Air Engineering, Inc., Los Angeles, Calif.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fresh'nd-Aire Co., Chicago, Ill.
Garden City Fan Co., Chicago, Ill.
Gehri Co., Tacoma, Wash.
General Blower Co., Inc., Philadelphia, Pa.
● General Blower Co., Morton Grove, Ill.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids Mich.
Guth Co., Edwin F., St. Louis, Mo.
Hartzell Propeller Fan Co., Piqua, O.
Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Holcomb & Hoke Mfg. Co., Indianapolis, Ind.
Holtum Mfg. Co., Freeport, Ill.
Hunter Fan & Ventilating Co., Inc., Memphis, Tenn.
● Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
● Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
Jamieson Mfg. Co., Dallas, Tex.
Jeffrey Mfg. Co., Columbus, O.
● Johnson Fan & Blower Corp., Chicago, Ill.
Johnston Co., William W., Dayton, O.
Jordan & Co., Paul R., Indianapolis, Ind.
King Ventilating Co., Owatonna, Minn.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Klee Co., Geo. B., Cincinnati, O.
● La-Del Conveyor & Mfg. Co., New Philadelphia, O.
● Lau Blower Co., Dayton, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Martin Fan & Blower Co., Chicago, Ill.
● McCord Corp., Detroit, Mich.
Meier Electric & Machine Co., Indianapolis, Ind.
Mountain States Equipment Co., Denver, Colo.
Myers Electric Co., Inc., Pittsburgh, Pa.
National Engineering & Mfg. Co., Kansas City, Mo.
Nelson Corp., Herman, Moline, Ill.
New York Blower Co., Chicago, Ill.

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Peerless Electric Co., Warren, O. (Disc)
Perkins & Son, Inc., B. F., Holyoke, Mass.
Phelps Mfg. Co., Little Rock, Ark.
Pritchard & Co., J. F., Kansas City, Mo.
Propellair, Inc., Springfield, O.
Reed Unit-Fans, Inc., New Orleans, La.
Reynolds Electric Co., Chicago, Ill.
Royal Air Conditioning Equipment Co., Alhambra, Calif.
Schelm Bros., Inc., East Peoria, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Scott-Newcomb, Inc., St. Louis, Mo.
Semco Mfg. Co., Nashville, Tenn.
Shreveport Engineering Co., Inc., Shreveport, La.
Signal Electric Mfg. Co., Menominee, Mich.
• Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Smith Mfg. Co., F. A., Rochester, N. Y.
• South Bend Air Products Corp., South Bend, Ind.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
Sutton Corp., O. A., Wichita, Kan.
Thermal Industries, Indio, Calif.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
• Trane Co., The, La Crosse, Wis.
Trufio Fan Co., Harmony, Pa.
• United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Victor Electric Products, Inc., Cincinnati, O.
Viking Air Conditioning Corp., Cleveland, O.
Water Cooling Equipment Corp., St. Louis, Mo.
Western Blower Co., Seattle, Wash.
Western Engineering & Mfg. Co., Los Angeles, Calif.
Wind-Way Fan & Ventilator Co., New Orleans, La.
• Wing Mfg. Co., L. J., New York, N. Y.

FEEDERS, CHEMICAL, PROPORTIONING

American Water Softener Co., Philadelphia, Pa.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Elgin Softener Corp., Elgin, Ill.
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Haering Co., Inc., D. W., Chicago, Ill.
Jeffrey Mfg. Co., Columbus, O.
% Proportioneers, Inc. %, Providence, R. I.
Permutit Co., New York, N. Y.
Roy Pumps, Milton, Philadelphia, Pa.
• Stephens-Adamson Mfg. Co., Aurora, Ill.
Syntron Co., Homer City, Pa.
Wade Mfg. Co., Elgin, Ill.
Wallace & Tiernan Co., Inc., Newark, N. J.

FEEDERS, WATER, HEATING BOILER

Cissell Mfg. Co., W. M., Louisville, Ky.
Davis Regulator Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
• General Controls Co., Glendale, Cal.
• Johnson Corp., Three Rivers, Mich.
• Kieley & Mueller, Inc., North Bergen, N. J.
Kisco Boiler & Engineering Co., St. Louis, Mo.
• Maid-O'-Mist, Inc., Chicago, Ill.
• McAlear Mfg. Co., Chicago, Ill.
• McDonnell & Miller, Chicago, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Nason Co., Detroit, Mich.
• Schaub Engineering Co., Fred H., Chicago, Ill.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Templeton Mfg. Co., Hyde Park, Mass.
Watts Regulator Co., Lawrence, Mass.
• Webster & Co., Warren, Camden, N. J.
Wright-Austin Co., Detroit, Mich.

FEEDWATER HEATERS

See Deaerators

FIBER PACKING

See Packing, Fiber

FIBER PIPE

See Pipe, Fiber

FILTER GAGES

See Gages, Air Filter

FILTERS, AIR, AUTOMATIC

• Air & Refrigeration Corp., New York, N. Y.
Air-Stream Filter Corp., St. Louis, Mo.
• American Air Filter Co., Inc., Louisville, Ky.
Brauer Supply Co., A. G., St. Louis, Mo.
• Dollinger Corp., Rochester, N. Y.
Dracco Corp., Cleveland, O.
• Farr Co., Los Angeles, Calif.

FILTERS, AIR, UNIT, CLEANABLE

• Air Devices, Inc., New York, N. Y.
Air Filter Corp., Milwaukee, Wis.
Air Filter Engineering Co., Chicago, Ill.
• Air-Maze Corp., Cleveland, O.
Air-Stream Filter Corp., St. Louis, Mo.
• American Air Filter Co., Inc., Louisville, Ky.
Amirton Co., Inc., New York, N. Y.
Badger Corp., Milwaukee, Wis.
Brauer Supply Co., A. G., St. Louis, Mo.
Chicago Filter Co., Joliet, Ill.
Coppus Engineering Corp., Worcester, Mass.
• Dollinger Corp., Rochester, N. Y.
• Farr Co., Los Angeles, Calif.
Filters, Inc., Glendale, Calif.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kaye & MacDonald, Inc., West Orange, N. J.
Kleenaire Corp., Stevens Point, Wis.
• Research Products Corp., Madison, Wis.
Somers, Inc., H. J., Detroit, Mich.
Supreme Air Filter Co., New York, N. Y.
Universal Air Filter Corp., Duluth, Minn.

FILTERS, AIR, UNIT, THROW-AWAY

• American Air Filter Co., Inc., Louisville, Ky.
Amirton Co., Inc., New York, N. Y.
Andale Co., Philadelphia, Pa.
Arcweld Mfg. Co., Inc., Seattle, Wash.
Badger Corp., Milwaukee, Wis.
Beckett & Co., Thomas, Dallas, Tex.
Blocksom & Co., Michigan City, Ind.
Chicago Filter Co., Joliet, Ill.
Gehri Co., Tacoma, Wash.
Kleenaire Corp., Stevens Point, Wis.
Owens-Corning Fiberglas Corp., Toledo, O.
• Research Products Corp., Madison, Wis.
Universal Air Filter Corp., Duluth, Minn.
Wilson & Co., Chicago, Ill.

FILTERS, ODOR

See Adsorbers, Odor

FILTERS, PIPE LINE

Adams Co., Inc., R. P., Buffalo, N. Y.
• Alco Valve Co., St. Louis, Mo.
• American Air Filter Co., Inc., Louisville, Ky.
American Locomotive Co., Alco Products Div., New York, N. Y.
• Automatic Products Co., Milwaukee, Wis.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bowser, Inc., Fort Wayne, Ind.
Cleveland Humidifier Co., Cleveland, O.
Commercial Filters Corp., Boston, Mass.
Cuno Engineering Corp., Meriden, Conn.
• Dollinger Corp., Rochester, N. Y.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
• Fisher Governor Co., Marshalltown, Ia.
General Motors Corp., Moraine Products Div., Dayton, O.
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Hotstream Heater Co., Cleveland, O. (air)
• Johnson Corp., Three Rivers, Mich.
Logan Engineering Co., Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
Newark Wire Cloth Co., Newark, N. J.
Norgren Co., C. A., Denver, Colo.
Patrol Valve Co., The, Cleveland, O.
Permutit Co., New York, N. Y.
Refinite Corp., Omaha, Neb.
Rega Mfg. Co., Rochester, N. Y.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Scientific Instrument Co., Detroit, Mich.
Trerice Co., Detroit, Mich.
Weatherhead Co., Cleveland, O.
Winslow Engineering Co., Oakland, Calif.
Worthington Pump & Machinery Corp., Harrison, N. J.

FILTERS, REFRIGERANT

• Alco Valve Co., St. Louis, Mo.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Commercial Filters Corp., Boston, Mass.
• General Motors Corp., Moraine Products Div., Dayton, O.
• Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
• Phillips & Co., H. A., Chicago, Ill.

FILTERS, WATER

• Alco Valve Co., St. Louis, Mo.
American Water Softener Co., Philadelphia, Pa.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bowser, Inc., Fort Wayne, Ind.
Cochrane Corp., Philadelphia, Pa.
Commercial Filters Corp., Boston, Mass.
• Dollinger Corp., Rochester, N. Y.
Elgin Softener Corp., Elgin, Ill.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Permutit Co., New York, N. Y.
Winslow Engineering Co., Oakland, Calif.
Worthington Pump & Machinery Corp., Harrison, N. J.

FINNED TUBING

See Tubing, Finned

FIRE PUMPS

See Pumps, Fire

FITTINGS, BLOW PIPE

Allington & Curtis Mfg. Co., Saginaw, Mich.
Chicago Metal Mfg. Co., Chicago, Ill.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Day Co., The, Minneapolis, Minn.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Kirk & Blum Mfg. Co., Cincinnati, O.
Mahon Co., R. C., Detroit, Mich.

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National Metal Fabricators, Chicago, Ill.
Northern Blower Co., Cleveland, O.
Peters-Dalton, Inc., Detroit, Mich.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Schmieg Industries, Detroit, Mich.
• Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Tiffin Eaves Trough Clamp Co., Tiffin, O.
United States Register Co., Battle Creek, Mich.
Western Blower Co., Seattle, Wash.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
Young & Bertke Co., Cincinnati, O.

FITTINGS, COPPER TUBE, COMPRESSION

• American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Downs-Smith Brass & Copper Co., New York, N. Y.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Everhot Products Co., Chicago, Ill.
• Grinnell Co., Inc., Providence, R. I.
Hays Mfg. Co., Erie, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Northern Indiana Brass Co., Elkhart, Ind.
Packless Metal Products Corp., New Rochelle, N. Y. (Self flaring)
Parker Appliance Co., Cleveland, O.

FITTINGS, COPPER TUBE, FLARED

Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Downs-Smith Brass & Copper Co., New York, N. Y.
• Grinnell Co., Inc., Providence, R. I.
Everhot Products Co., Chicago, Ill.
Hays Mfg. Co., Erie, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.

FITTINGS, COPPER TUBE, SOLDER

Acheson Mfg. Co., Rankin, Pa.
• American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
• Crane Co., Chicago, Ill.
Downs-Smith Brass & Copper Co., New York, N. Y.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Grabler Mfg. Co., Cleveland, O.
• Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Union Metal Works, Chelsea, Mass.
• Walworth Co., New York, N. Y. (Brazed)

FITTINGS, DRAINAGE, FIXED AIR BREAK

American Sterilizer Co., Erie, Pa.
• Crane Co., Chicago, Ill.
Scanlan-Morris Co., Madison, Wis.
Semler Co., Jeannette, Pa.
Wade Mfg. Co., Elgin, Ill.

FITTINGS, HOT WATER HEATING SYSTEMS, ONE PIPE

• Bell & Gossett Co., Morton Grove, Ill.
Kehm Corp., The, Chicago, Ill.
Semler Co., Jeannette, Pa.
Taco Heaters, Inc., New York, N. Y.
• Thrush & Co., H. A., Peru, Ind.
• Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Peru, Ind.

FITTINGS, LINED

American Hard Rubber Co., New York, N. Y. (Rubber)
American Smelting & Refining Co., New York, N. Y.
Cement Lined Pipe Co., Lynn, Mass.
Goodrich Co., B. F., Akron, O. (Rubber)
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin)
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Michigan Pipe Co., Bay City, Mich.
National Lead Co., New York, N. Y. (Lead)
Northern Indiana Brass Co., Elkhart, Ind. (Tinned)
Resisto Pipe & Valve Co., East Cambridge, Mass.
United States Rubber Co., New York, N. Y. (Rubber)

FITTINGS, PIPE, BRASS, SOLDER

Acheson Mfg. Co., Rankin, Pa.
• American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
• Crane Co., Chicago, Ill.
Downs-Smith Brass & Copper Co., New York, N. Y.
Everhot Products Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Keeney Mfg. Co., Newington, Conn.
• Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Parker Appliance Co., Cleveland, O.
Union Metal Works, Chelsea, Mass.
• Walworth Co., New York, N. Y. (Brazed)

FITTINGS, PIPE, BRASS, THREADED

Acheson Mfg. Co., Rankin, Pa.
American Manganese Bronze Co., Philadelphia, Pa.
Belfield Co., H., Philadelphia, Pa.
Bowser, Inc., Fort Wayne, Ind.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
• Crane Co., Chicago, Ill.
Downs-Smith Brass & Copper Co., New York, N. Y.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Grabler Mfg. Co., Cleveland, O.
• Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
• Kennedy Valve Mfg. Co., Elmira, N. Y.
Leavitt Machine Co., Orange, Mass.
Lunkenheimer Co., Cincinnati, O.
Newman Brothers, Inc., Cincinnati, O.
New York Brass Fdry., New York, N. Y.
Parker Appliance Co., Cleveland, O.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Phoenix Brass Fittings Corp., Irvington, N. J.
Ross Sprinkler Co., Pasadena, Calif.
Union Metal Wks., Chelsea, Mass.
• Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

FITTINGS, PIPE, BRASS, WELDING

• Bonney Forge & Tool Wks., Allentown, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
• Midwest Piping & Supply Co., Inc., St. Louis, Mo.
• Tube Turns, Inc., Louisville, Ky.
• Walworth Co., New York, N. Y. (Brazed)

FITTINGS, PIPE, BRONZE, BRAZED

Chase Brass & Copper Co., Waterbury, Conn.
• Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Kaltenthaler Co., H. J., Philadelphia, Pa.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Newman Brothers, Inc., Cincinnati, O.
Union Metal Works, Chelsea, Mass.
• Walworth Co., New York, N. Y.

FITTINGS, PIPE, CAST IRON, FLANGED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Central Foundry Co., New York, N. Y.
Clow & Sons, James B., Chicago, Ill.
• Crane Co., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Eastern Foundry Co., Boyertown, Pa.
Frick Co., Waynesboro, Pa.
• Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Kaltenthaler Co., H. J., Philadelphia, Pa.
• Kennedy Valve Mfg. Co., The, Elmira, N. Y.
• Kuhns Bros. Co., Dayton, O.
Lynchburg Foundry Co., Lynchburg, Va.
Malleable Iron Fittings Co., Branford, Conn.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semler Co., Jeannette, Pa.
Stockham Pipe Fittings Co., Birmingham, Ala.
Straight Line Foundry & Machine Corp., Direct Separator Div. The, Syracuse, N. Y.
United States Pipe & Foundry Co., Burlington, N. J.
• Walworth Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.

FITTINGS, PIPE, CAST IRON, THREADED

Central Foundry Co., New York, N. Y.
Clow & Sons, James B., Chicago, Ill.
• Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
Eastern Foundry Co., Boyertown, Pa.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Frick Co., Waynesboro, Pa.
Grabler Mfg. Co., Cleveland, O.
• Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
• Kuhns Bros. Co., Dayton, O.
Malleable Iron Fittings Co., Branford, Conn.
Ravena Iron Co., Ravena, N. Y.
Semler Co., Jeannette, Pa.
Somerville Iron Works, Somerville, N. J.
Stockham Pipe Fittings Co., Birmingham, Ala.
• Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

FITTINGS, PIPE, COMPRESSION

• Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Hays Mfg. Co., Erie, Pa.
Patrol Valve Co., The, Cleveland, O.

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FITTINGS, PIPE, HARD RUBBER

American Hard Rubber Co., New York, N. Y.
Goodrich Co., B. F., Akron, O.
Luzerne Rubber Co., Trenton, N. J.

FITTINGS, PIPE, LEAD

Alpha Metals, Inc., Brooklyn, N. Y.
American Smelting & Refining Co., New York, N. Y.
Eagle-Picher Co., Cincinnati, O.
Flemm Lead Co., Inc., Long Island City, N. Y.
Lead Lined Iron Pipe Co., Wakefield, Mass.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Rochester Lead Works, Inc., Rochester, N. Y.

FITTINGS, PIPE, MALLEABLE

• Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Grabler Mfg. Co., Cleveland, O.
• Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
• Kennedy Valve Mfg. Co., Elmira, N. Y.
Malleable Iron Fittings Co., Branford, Conn.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Rhode Island Fittings Co., Hillsgrove, R. I.
Stockham Pipe Fittings Co., Birmingham, Ala.
Victaulic Co. of America, New York, N. Y.
• Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

FITTINGS, PIPE, NICKEL AND NICKEL ALLOY

American Manganese Bronze Co., Philadelphia, Pa.
Cooper Alloy Foundry Co., Hillside, N. J.
• Crane Co., Chicago, Ill.
Hasco Valve & Machine Co., Milwaukee, Wis.
International Nickel Co., New York, N. Y.
Ladish Drop Forge Co., Fittings Div., Cudahy, Wis.
Parker Appliance Co., Cleveland, O.
• Tube Turns, Inc., Louisville, Ky.
Warren Foundry & Pipe Corp., New York, N. Y.

FITTINGS, PIPE, PLASTIC

Acadia Synthetic Products Div., Western Felt Works, Chicago Ill.
American Hard Rubber Co., New York, N. Y.
Commercial Plastics Co., Chicago, Ill.
Commonwealth Products Co., Philadelphia, Pa.
Hodgman Rubber Co., Framingham, Mass.
Mills Corp., Elmer E., Chicago, Ill.
North Penn Co., New York, N. Y.
Parker Appliance Co., The, Cleveland, O.
United States Stoneware Co., New York, N. Y.
Yardley Plastics Co., Columbus, O.

FITTINGS, PIPE, STEEL, FLANGED

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
• American Rolling Mill Co., The, Middletown, O.
• Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Frick Co., Waynesboro, Pa.
Hamer Oil Tool Co., Long Beach, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
Kerotest Mfg. Co., Pittsburgh, Pa.
Ladish Drop Forge Co., Fittings Div., Cudahy, Wis.
National Valve & Mfg. Co., Pittsburgh, Pa.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Semet-Solvay Engrg. Corp., New York, N. Y.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.
• Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, STEEL, FORGED, THREADED

Catawissa Valve & Fittings Co., Catawissa, Pa.
• Crane Co., Chicago, Ill.
• Henry Valve Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Ladish Drop Forge Co., Fittings Div., Cudahy, Wis.
Larkin Packer Co., St. Louis, Mo.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.
• Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, STEEL, SOCKET WELD

Catawissa Valve & Fittings Co., Catawissa, Pa.
• Crane Co., Chicago, Ill.
Ladish Drop Forge Co., Fittings Div., Cudahy, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.
• Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, STEEL, THREADED

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
Catawissa Valve & Fittings Co., Catawissa, Pa.
Colonial Alloys Co., Metals Div., Philadelphia, Pa. (Stainless)
• Crane Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
Ladish Drop Forge Co., Fittings Div., Cudahy, Wis.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Tubing Seal-Cap, Inc., Los Angeles, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.
• Watson-Stillman Co., Roselle, N. J.
Wedge Protectors, Inc., Cleveland, O.

FITTINGS, PIPE, STEEL, WELDING

• American Rolling Mill Co., The, Middletown, O.
• Bonney Forge & Tool Wks., Allentown, Pa.
Catawissa Valve & Fittings Co., Catawissa, Pa.
• Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Globe Steel Tubes Co., Milwaukee, Wis.
• Grinnell Co., Inc., Providence, R. I.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Ladish Drop Forge Co., Fittings Div., Cudahy, Wis.
Larkin Packer Co., St. Louis, Mo.
• Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Oil Well Supply Co., Oil City, Pa.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semet-Solvay Engineering Corp., New York, N. Y.
• Taylor Forge & Pipe Wks., Chicago, Ill.
• Tube Turns, Inc., Louisville, Ky.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.
Wedge Protectors, Inc., Cleveland, O. (Chill rings)

FITTINGS, PIPE, WROUGHT IRON, WELDING

• Bonney Forge & Tool Wks., Allentown, Pa.
• Grinnell Co., Inc., Providence, R. I.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Ladish Drop Forge Co., Fittings Div., Cudahy, Wis.
• Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
• Taylor Forge & Pipe Wks., Chicago, Ill.
• Tube Turns, Inc., Louisville, Ky.

FITTINGS, REFRIGERATION

Aeroquip Corp., Jackson, Mich.
American Injector Co., Detroit, Mich.
• Baker Ice Machine Co., Inc., Omaha, Neb.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
• Crane Co., Chicago, Ill.
Dersch, Geeswein & Neuert, Inc., Chicago, Ill.
Downs-Smith Brass & Copper Co., New York, N. Y.
• Electrimatic, Chicago, Ill.
Frick Co., Waynesboro, Pa.
Hays Mfg. Co., Erie, Pa.
• Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
• Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Parker Appliance Co., Cleveland, O.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.
• Watson-Stillman Co., Roselle, N. J.
Weatherhead Co., Cleveland, O.
Wittenmeier Machinery Co., Chicago, Ill.
• Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Inc., Chicago, Ill.
York Corp., York, Pa.

FITTINGS, STEEL TUBE, FLARED

• Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.

FLAME CONTROLS

See Controls, Flame Failure

FLANGE BOLTS

See Bolts and Studs, Flange

FLANGES, ORIFICE

Ladish Drop Forge Co., Fittings Div., Cudahy, Wis.
Meriam Instrument Co., The, Cleveland, O.

FLANGES, PIPE, ALLOY STEEL, LAP JOINT

Cooper Alloy Foundry Co., Hillside, N. J.
• Crane Co., Chicago, Ill.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Ladish Drop Forge Co., Fittings Div., Cudahy, Wis.
Limbert & Co., Geo. B., Chicago, Ill.
• Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.

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Semet-Solvay Engineering Corp., New York, N. Y.
• Taylor Forge & Pipe Works, Chicago, Ill.
• Tube Turns, Inc., Louisville, Ky.
• Walworth Co., New York, N. Y.

FLANGES, PIPE, ALLOY STEEL, SCREWED

Alloy Steel Products Co., Linden, N. J.
Cooper Alloy Foundry Co., Hillside, N. J.
• Crane Co., Chicago, Ill.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
International Nickel Co., Inc., The, New York, N. Y. (nickel and nickel alloy)
Ladish Drop Forge Co., Fittings Div., Cudahy, Wis.
Limbert & Co., Geo. B., Chicago, Ill.
• Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
• Taylor Forge & Pipe Works, Chicago, Ill.
• Tube Turns, Inc., Louisville, Ky.
• Walworth Co., New York, N. Y.

FLANGES, PIPE, ALLOY STEEL, WELDING

Cooper Alloy Foundry Co., Hillside, N. J.
• Crane Co., Chicago, Ill.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Ladish Drop Forge Co., Fittings Div., Cudahy, Wis.
Limbert & Co., Geo. B., Chicago, Ill.
• Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Semet-Solvay Engineering Corp., New York, N. Y.
• Taylor Forge & Pipe Works, Chicago, Ill.
• Tube Turns, Inc., Louisville, Ky.
• Walworth Co., New York, N. Y.

FLANGES, PIPE, BRASS, SCREWED

Acheson Mfg. Co., Rankin, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
• Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
• Grinnell Co., Inc., Providence, R. I.
Jarecki Mfg. Co., Erie, Pa.
Kaltenthaler Co., H. J., Philadelphia, Pa.
Kopperman & Sons, Joseph, Philadelphia, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Union Metal Works, Chelsea, Mass.
• Walworth Co., New York, N. Y.

FLANGES, PIPE, CAST IRON, SCREWED

Clow & Sons, James B., Chicago, Ill.
• Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
• Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Kaltenthaler Co., H. J., Philadelphia, Pa.
• Kuhns Bros. Co., Dayton, O.
Limbert & Co., Geo. B., Chicago, Ill.
Lynchburg Foundry Co., Lynchburg, Va.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Ravena Iron Co., Ravena, N. Y.
Semler Co., Jeannette, Pa.
Stockham Pipe Fittings Co., Birmingham, Ala.
Straight Line Foundry & Machine Corp., Direct Separator Div., Syracuse, N. Y.
• Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Warren Foundry & Pipe Corp., New York, N. Y.

FLANGES, PIPE, MALLEABLE IRON, SCREWED

• Baker Ice Machine Co., Inc., Omaha, Neb.
• Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
• Grinnell Co., Inc., Providence, R. I.
Jarecki Mfg. Co., Erie, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Rhode Island Fittings Co., Hillsgrove, R. I.
• Walworth Co., New York, N. Y.

FLANGES, PIPE, NICKEL AND NICKEL ALLOY

Cooper Alloy Foundry Co., Hillside, N. J.
International Nickel Co., Inc., The, New York, N. Y.
Ladish Drop Forge Co., Fittings Div., Cudahy, Wis.

FLANGES, PIPE, STEEL, LAP JOINT

• Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
• Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
Ladish Drop Forge Co., Fittings Div., Cudahy, Wis.
Limbert & Co., Geo. B., Chicago, Ill.
• Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Semet-Solvay Engineering Corp., New York, N. Y.
• Taylor Forge & Pipe Works, Chicago, Ill.
• Tube Turns, Inc., Louisville, Ky.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.

FLANGES, PIPE, STEEL, SCREWED

• Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
• Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
Ladish Drop Forge Co., Fittings Div., Cudahy, Wis.
Limbert & Co., Geo. B., Chicago, Ill.
• Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
• Taylor Forge & Pipe Works, Chicago, Ill.
• Tube Turns, Inc., Louisville, Ky.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.

FLANGES, PIPE, STEEL, WELDING

• American Rolling Mill Co., The, Middletown, O.
• Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
• Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
Ladish Drop Forge Co., Fittings Div., Cudahy, Wis.
Limbert & Co., Geo. B., Chicago, Ill.
• Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
• Naylor Pipe Co., Chicago, Ill.
Pennsylvania Forge Co., Philadelphia, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Roessing Mfg. Co., Pittsburgh, Pa.
Semet-Solvay Engineering Corp., New York, N. Y.
• Taylor Forge & Pipe Works, Chicago, Ill.
• Tube Turns, Inc., Louisville, Ky.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.

FLARED FITTINGS, COPPER TUBE

See Fittings, Copper Tube, Flared

FLARED FITTINGS, STEEL TUBE

See Fittings, Steel Tube, Flared

FLARING TOOLS FOR TUBING

See Tools, Flaring

FLEXIBLE COUPLINGS

See Couplings, Flexible

FLEXIBLE DUCT CONNECTIONS

See Connections, Duct, Flexible

FLEXIBLE METAL HOSE

See Hose, Metal and Fittings

FLOAT SWITCHES

See Switches, Float

FLOAT VALVES

See Valves, Float

FLOATS, STEAM TRAP, ETC.

Clark Controller Co., Cleveland, O.
• Crane Co., Chicago, Ill.
Cryer Trap & Valve Co., Inc., New York, N. Y.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
Harris & Co., Arthur, Chicago, Ill.
Hercules Float Wks., Springfield, Mass.
• Hoffman Specialty Co., Indianapolis, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
• Kieley & Mueller, Inc., North Bergen, N. J.
• McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Naugatuck Mfg. Co., Union City, Conn.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Reichert Float & Mfg. Co., Toledo, O.
Reliance Gauge Column Co., Cleveland, O.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Templeton Mfg. Co., Hyde Park, Mass.
• Trane Co., The, La Crosse, Wis.
Vapor Specialty Co., New York, N. Y.
Watson & McDaniel Co., Philadelphia, Pa.
Williams Gauge Co., Pittsburgh, Pa.
Wright-Austin Co., Detroit, Mich.

FLOOR AND CEILING PLATES

See Plates, Floor and Ceiling

FLOW CONTROL VALVES

See Valves, Flow Control

FLOW METERS

See Meters, Flow

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FLOW SWITCHES
See Switches, Flow

FORGED STEEL VALVES
See Valves, Forged Steel

FRESHENERS, AIR
See Adsorbers, Odor

FUEL ECONOMIZERS
See Economizers, Fuel

FURNACES, WARM AIR, FOR INDUSTRIAL AND LARGE BUILDING HEATING

• Airtherm Mfg. Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Areweld Mfg. Co., Inc., Seattle, Wash.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Bryant Heater Co., The, Cleveland, O.
Campbell Heating Co., Des Moines, Ia.
Campbell Heating Co., E. K., Kansas City, Mo.
Certified Furnace Co., Div. of Stainless & Steel Products Co., St. Paul, Minn.
• Dravo Corp., Pittsburgh, Pa.
International Sales Co., San Francisco, Calif.
• Jackson & Church Co., Saginaw, Mich.
Lee Engineering Co., Youngstown, O.
Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y., and Columbus, O.
Magirl Foundry & Furnace Wks., P. H., Bloomington, Ill.
Majestic Co., Huntington, Ind.
Mayflower Air-Conditioners, Inc., St. Paul, Minn.
McCann Furnace Co., Cleveland, O.
McPherson Furnace & Supply Co., Portland, Ore.
Meyer Furnace Co., The, Peoria, Ill.
Monerief Furnace Co., Atlanta, Ga.
Montag Stove & Furnace Wks., Portland, Ore.
• Mueller Furnace Co., L. J., Milwaukee, Wis.
National Heater Co., Minneapolis, Minn.
National Mfg. & Engineering Co., Detroit, Mich.
Northwest Foundry & Furnace Co., Portland, Ore.
Palmer Mfg. Corp., Phoenix, Ariz.
Payne Furnace & Supply Co., Inc., Beverly Hills, Calif.
Rosebraugh Co., W. W., Salem, Ore.
• Surface Combustion Corp., Toledo, O.
• Syncromatic Corp., Milwaukee, Wis.
XXth Century Heating & Ventilating Co., Akron, O.
United States Radiator Corp., Detroit, Mich.
Western Furnaces, Inc., Tacoma, Wash.
Williamson Heater Co., Cincinnati, O.

FUSIBLE LINKS
See Links, Fusible

GAGE GLASSES
See Glasses, Gage

GAGE TESTERS
See Testers, Gage, Dead Weight

GAGES, AIR FILTER

Air Filter Engineering Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
• Hays Corp., Michigan City, Ind.
Herbusch Corp., The, St. Louis, Mo. (Warning device)
Hill, E. Vernon, Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Uehling Instrument Co., Paterson, N. J.

GAGES, INDICATING, DRAFT

Ashcroft Gauge Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Cole-Sullivan Engineering Co., Minneapolis, Minn.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Elmer & Amend, New York, N. Y.
Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
• Hays Corp., Michigan City, Ind.
Hill, E. Vernon, Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Moeller Instrument Co., Richmond Hill, N. Y.
Precision Scientific Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

GAGES, INDICATING, PRESSURE

Ashcroft Gauge Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Ashton Valve Co., Cambridge, Mass.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Belfield Co., H., Philadelphia, Pa.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Detroit Brass & Malleable Wks., Detroit, Mich.
• Dole Valve Co., The, Chicago, Ill.
Elmer & Amend, New York, N. Y.
Electric Auto-Lite Co., Instrument & Gauge Div., La Crosse, Wis.
Foxboro Co., Foxboro, Mass.
• Hays Corp., Michigan City, Ind.
Helicoid Gage Div., American Chain & Cable Co., Long Island City, N. Y.
Hill, E. Vernon, Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
• Leeds & Northrup Co., Philadelphia, Pa.
Lonergan Co., J. E., Philadelphia, Pa.
Marsh Corp., Jas. P., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The Cleveland, O.
Moeller Instrument Co., Richmond Hill, N. Y.
Mouat Vapor Heating Co., The, Cleveland, O.
Norgren Co., C. A., Denver, Colo.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Stewart-Warner Corp., Chicago, Ill.
• Taylor Instrument Companies, Rochester, N. Y.
• Thrush & Co., H. A., Peru, Ind.
• Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Triplex Heating Specialty Co., Peru, Ind.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Co., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.

GAGES, INDICATING, VACUUM

American Schaeffer & Budenberg Instrument Div., Manning Maxwell & Moore, Inc., Bridgeport, Conn.
Ashton Valve Co., Cambridge, Mass.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Belfield Co., H., Philadelphia, Pa.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
• Dole Valve Co., The, Chicago, Ill.
Elmer & Amend, New York, N. Y.
Electric Auto-Lite Co., Instrument & Gauge Div., La Crosse, Wis.
Foxboro Co., Foxboro, Mass.
• Hays Corp., Michigan City, Ind.
Helicoid Gage Div., American Chain & Cable Co., Long Island City, N. Y.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Marsh Corp., Jas. P., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Moeller Instrument Co., Richmond Hill, N. Y.
Mouat Vapor Heating Co., The, Cleveland, O.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Stewart-Warner Corp., Chicago, Ill.
Stokes Machine Co., F. J., Philadelphia, Pa.
• Taylor Instrument Companies, Rochester, N. Y.
• Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Co., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.

GAGES, LIQUID LEVEL

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Injector Co., Detroit, Mich.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Barton Instrument Co., Los Angeles, Calif.
Bordo Co., Inc., L. J., Glenside, Pa.
Boston Auto Gage Co., Pittsfield, Mass.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.

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Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Caldwell Co., W. E., Louisville, Ky.
Defender Instrument and Regulator Co., St. Louis, Mo.
Diamond Power Specialty Corp., Detroit, Mich.
Foxboro Co., Foxboro, Mass.
Frick Co., Waynesboro, Pa.
• Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Keckley Co., O. C., Chicago, Ill.
King Engineering Corp., Ann Arbor, Mich.
Klingerit, Inc., New York, N. Y.
• Krueger Sentry Gauge Co., Green Bay, Wis.
• Leeds & Northrup Co., Philadelphia, Pa.
Liquidometer Corp., Long Island City, N. Y.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Meriam Instrument Co., The, Cleveland, O.
• McAlear Mfg. Co., Chicago, Ill.
Moore Products Co., Philadelphia, Pa.
Nason Co., Detroit, Mich.
Penberthy Injector Co., Detroit, Mich.
Petrometer Corp., Long Island City, N. Y.
Powell Co., Wm., Cincinnati, O.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Reliance Gauge Column Co., Cleveland, O.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Stewart-Warner Corp., Chicago, Ill.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Techtmann Industries, Inc., Milwaukee, Wis.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Co., Sellersville, Pa.
Viking Pump Co., Cedar Falls, Ia.
Williams Gauge Co., Pittsburgh, Pa. (Water)
Wright-Austin Co., Detroit, Mich.
• Yarnall-Waring Co., Philadelphia, Pa.

GALVANIZED SHEETS

See Sheets, Steel, Galvanized

GALVANNEALED SHEETS

See Sheets, Steel, Galvannealed

GAS BURNERS

See Burners, Gas

GAS ENGINES

See Engines, Gas

GAS FIRED RADIATORS

See Radiators, Gas Fired

GAS PRESSURE REGULATORS

See Regulators, Pressure, Gas

GAS VOLUME METERS

See Meters, Volume, Air and Gas

GASKETS

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill. (Felt, rubber)
Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Akron Metallic Gasket Co., Akron, O. (Metal & metal asbestos)
Alpha Metals, Inc., Brooklyn, N. Y.
American Smelting & Refining Co., New York, N. Y.
Anchor Packing Co., Philadelphia, Pa. (Asbestos)
Armstrong Cork Co., Lancaster, Pa. (Cork & cork composition)
Azor Corp., Irvington, N. J. (Spiral wound)
Baldwin Belting, Inc., New York, N. Y.
Belmont Packing & Rubber Co., Philadelphia, Pa.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y. (Lead)
Chase Brass & Copper Co., Waterbury, Conn. (Brass)
Chicago-Wilcox Mfg. Co., Chicago, Ill.
Clow & Sons, James B., Chicago, Ill.
Continental Diamond Fibre Co., Newark, Del.
Continental Rubber Wks., Erie, Pa.
• Crane Co., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y. (Asbestos)
Durabla Mfg. Co., New York, N. Y. (Asbestos fibre)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Endura Mfg. Corp., Quakertown, Pa. (Paper, fibre)
Excelsior Leather Washer Mfg. Co., Rockford, Ill.
Felt Products Mfg. Co., Chicago, Ill. (Heat and oil resisting)
Felters Co., Inc., Boston, Mass.
Flexatalic Gasket Co., Camden, N. J. (Metal, asbestos)
Flexlock Corp., Akron, O.
Frick Co., Waynesboro, Pa.
Garlock Packing Co., Palmyra, N. Y. (Rubber, asbestos, fibre, semi-metallic)
Gates Rubber Co., The, Denver, Colo.
Gatke Corp., Chicago, Ill.
Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.
Goodrich Co., B. F., Akron, O.
• Grant Wilson, Inc., Chicago, Ill. (Asbestos)
Graton & Knight Co., Worcester, Mass. (Leather)
Greene, Tweed & Co., New York, N. Y.
Houghton & Co., E. F., Philadelphia, Pa. (Leather)
• Jenkins Bros., New York, N. Y. (Ring asbestos or rubber sheet)
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa. (Asbestos)
Klingerit, Inc., New York, N. Y.
Linear Incorporated, Philadelphia, Pa.
Manhattan Rubber Mfg., Div. of Raybestos-Manhattan, Inc., Passaic, N. J.
Metallo Gasket Co., New Brunswick, N. J. (Metal, metal asbestos)
Mitchell & Smith, Inc., Detroit, Mich. (Cork)
Mortell Co., J. W., Kankakee, Ill.
National Engineering Products, Inc., Washington, D. C. (Plastic)
National Lead Co., New York, N. Y.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Permatex Co., Inc., Brooklyn, N. Y.
• Products Research Co., Los Angeles, Calif.
Quaker Rubber Corp., Philadelphia, Pa.
Radiator Specialty Co., Charlotte, N. C.
Resistoflex Corp., Belleville, N. J.
Ruberoid Co., New York, N. Y. (Asbestos)
Schieren Co., Chas. A., New York, N. Y.
Sherwin-Williams Co., The, Cleveland, O.
Smooth-On Mfg. Co., Jersey City, N. J. (Corrugated iron)
Steel Improvement & Forge Co., Cleveland, O.
Stokes Rubber Co., Jos., Trenton, N. J. (Hard rubber)
Technical Ply-Woods, Chicago, Ill.
Thermoid Rubber, Div. of Thermoid Co., Trenton, N. J.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Gasket Co., Camden, N. J.
United States Rubber Co., New York, N. Y. (Rubber, asbestos)
United States Stoneware Co., New York, N. Y.
Vibration Engineering Co., The, New York, N. Y. (cork)
Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Western Felt Wks., Chicago, Ill. (Felt)
• Wilson, Inc., Grant, Chicago, Ill. (Asbestos)

GASOLINE FIRED HEATERS

See Heaters, Gasoline Fired

GATE VALVES

See Valves, Gate

GATES, BLAST

Allington & Curtis Mfg. Co., Saginaw, Mich.
Berger Bros. Co., Philadelphia, Pa.
Blower Application Co., Milwaukee, Wis.
• Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
• Clarage Fan Co., Kalamazoo, Mich.
Day Co., The, Minneapolis, Minn.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Kirk & Blum Mfg. Co., Cincinnati, O.
Maysteel Products, Inc., Milwaukee, Wis.
National Metal Fabricators, Chicago, Ill.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
R-S Products Corp., Philadelphia, Pa.
Spencer Turbine Co., Hartford, Conn.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Boston, Mass.
Western Blower Co., Seattle, Wash.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.

GLASS, HEAT ABSORBING

See Windows, Heat Insulating

GLASS PIPE

See Pipe, Glass

GLASSES, GAGE

Bache, Semon & Co., New York, N. Y.
Chicago Specialty Mfg. Co., Chicago, Ill.
Corning Glass Works, Corning, N. Y.
• Crane Co., Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., La Crosse, Wis.
Fischer & Porter Co., Hatboro, Pa.
Klingerit, Inc., New York, N. Y.
Libbey-Owens Ford Glass Co., Toledo, O.
Lunkenheimer Co., Cincinnati, O.
Powell Co., Wm., Cincinnati, O.
Semon Bache & Co., New York, N. Y.

GLASSES, SIGHT, FOR PIPE LINES

• American District Steam Co., North Tonawanda, N. Y.
Bowser, Inc., Fort Wayne, Ind.
Cochrane Corp., Philadelphia, Pa.
Corning Glass Works, Corning, N. Y.
Imperial Brass Mfg. Co., Chicago, Ill.
Libbey-Owens Ford Glass Co., Toledo, O.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Weatherhead Co., Cleveland, O.

GLOBE VALVES

See Valves, Globe

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GOVERNORS, PUMP

Atlas Valve Co., Inc., Newark, N. J.
Boylston Steam Specialty Co., Chicago, Ill.
Burrows Mfg. Co., F. A., York, Pa.
• Cash Co., A. W., Decatur, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
• Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Gardner-Denver Co., Quincy, Ill.
• Hagan Corp., Pittsburgh, Pa.
Jarecki Mfg. Co., Erie, Pa.
Keckley Co., O. C., Chicago, Ill.
• Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Chicago, Ill.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
• McAlear Mfg. Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Northern Equipment Co., Erie, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Sampsel Time Control, Inc., Spring Valley, Ill.
Schade Valve Mfg. Co., Philadelphia, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Swartwout Co., Cleveland, O.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
• Webster & Co., Warren, Camden, N. J.
Williams Gauge Co., Pittsburgh, Pa.
Wright-Austin Co., Detroit, Mich.

GRILLES

See also Diffusers; Panels, Perforated, for Air Diffusion; Registers

A-J Mfg. Co., Kansas City, Mo.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Air Control Products, Inc., Coopersville, Mich.
• Air Devices, Inc., New York, N. Y.
AirO-Fin Register Co., Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
• Auer Register Co., Cleveland, O.
• Barber-Colman Co., Rockford, Ill.
Beckley Perforating Co., Garwood, N. J.
Best Register Co., Milwaukee, Wis.
Central Wire & Iron Works, Des Moines, Ia.
Char-Gale Mfg. Co., Minneapolis, Minn.
Controlair Mfg. Co., Los Angeles, Calif.
• Crown Iron Works, Minneapolis, Minn.
Decatur Iron & Steel Co., Decatur, Ala.
Diamond Mfg. Co., Wyoming, Pa.
Downs-Smith Brass & Copper Co., New York, N. Y.
Eaglesfield Ventilator Co., Indianapolis, Ind. (wood)
Empire Ventilation Equipment Co., Long Island City, N. Y.
Erdle Perforating Co., Rochester, N. Y.
Gilliam Mfg. Co., Detroit, Mich.
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Mfg. Co., Holland, Mich.
Hendrick Mfg. Co., Carbondale, Pa.
Independent Register Co., Cleveland, O.
Jamieson Mfg. Co., Dallas, Tex.
Johnston & Chapman Co., Chicago, Ill.
Lockjoint Wood Products Co., Wichita, Kans. (Wood)
Manhattan Perforated Metal Co., Inc., Long Island City, N. Y.
• Mueller Furnace Co., L. J., Milwaukee, Wis.
Mundt & Sons, Charles, Jersey City, N. J.
Newman Brothers, Inc., Cincinnati, O.
Register & Grille Mfg. Co., Brooklyn, N. Y.
Reliable Perforating Co., Chicago, Ill.
Rock Island Register Co., Rock Island, Ill.
Schoedinger, F. O., Columbus, O.
• Standard Stamping & Perforating Co., Chicago, Ill.
Stewart Mfg. Co., Bloomfield, N. J.
• Tuttle & Bailey, Inc., New Britain, Conn.
• United States Air Conditioning Corp., Minneapolis, Minn.
United States Register Co., Battle Creek, Mich.
Utility Appliance Corp., Los Angeles, Calif.
• Waterloo Register Div. of Associated Manufacturers, Inc., Waterloo, Ia.
Western Wire & Iron Works, Inc., Chicago, Ill. (metal)
Wickwire Spencer Steel Div. of Colorado Fuel & Iron Corp., New York, N. Y.
Young Regulator Co., Cleveland, O.

GUNS AND POTS, SMOKE AND SMUDGE, FOR TESTING AIR MOVEMENT

Hill, E. Vernon, Chicago, Ill.
Newman Co., Inc., I. C., New York, N. Y. (smoke containers)
Pains Fireworks Display Co., New York, N. Y.

HAND SHEARS

See Shears and Snips, Hand

HANGERS OR BRACKETS, RADIATOR

American Foundry & Furnace Co., Bloomington, Ill.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
• Bell & Gossett Co., Morton Grove, Ill.
Carpenter & Paterson, Inc., East Boston, Mass.
Carty & Moore Engineering Co., Detroit, Mich.
Chicago Nipple Mfg. Co., Chicago, Ill.
• Crane Co., Chicago, Ill.
Crawford Co., Chicago, Ill.
Fee & Mason Mfg. Co., Inc., New York, N. Y.
Grabler Mfg. Co., Cleveland, O.
• Grinnell Co., Inc., Providence, R. I.
Hartmann Co., Chas., Brooklyn, N. Y.
Healy Ruff Co., St. Paul, Minn.
Jennison Co., Fitchburg, Mass. (Adjustable radiator foot rest)
• McAlear Mfg. Co., Chicago, Ill.
• National Radiator Co., The, Johnstown, Pa.
Richmond Radiator Co., Gas Products Div., Uniontown, Pa.
United Appliance Co., Rochester, N. Y.
United States Radiator Corp., Detroit, Mich.
Western Hanger Co., San Francisco, Calif.

HANGERS AND SUPPORTS, PIPE

Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
• American District Steam Co., North Tonawanda, N. Y.
Carpenter & Paterson, Inc., East Boston, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Nipple Mfg. Co., Chicago, Ill.
• Crane Co., Chicago, Ill.
Crawford Co., Chicago, Ill.
Farley Sleeve & Hanger Co., Cleveland, O.
Fee & Mason Mfg. Co., Inc., New York, N. Y.
Frick Co., Waynesboro, Pa.
Genspring, Inc., New York, N. Y.
Globe Machine & Stamping Co., Div. of Hupp Motor Car Corp., Cleveland, O.
Grabler Mfg. Co., Cleveland, O.
• Grinnell Co., Inc., Providence, R. I.
Jarecki Mfg. Co., Erie, Pa.
• Midwest Piping & Supply Co., Inc., St. Louis, Mo.
• Mineralac Electric Co., Chicago, Ill.
• Moore Co., Goodloe E., Danville, Ill.
• National Valve & Mfg. Co., Pittsburgh, Pa.
Packless Metal Products Corp., New Rochelle, N. Y. (Flexible fasteners for metal hose and tubing)
Paine Co., Chicago, Ill.
Power Piping Div., Blaw-Knox Co., Pittsburgh, Pa.
Ravena Iron Co., Ravena, N. Y.
Ric-wiL Co., Cleveland, O. (Underground)
Rockwood Sprinkler Co., Worcester, Mass.
Roessing Mfg. Co., Pittsburgh, Pa.
Truscon Steel Co., Youngstown, O.
• Walworth Co., New York, N. Y.
Western Wire Products Co., St. Louis, Mo.

HARD RUBBER PIPE AND FITTINGS

See Pipe, Hard Rubber; Fittings, Pipe, Hard Rubber

HEADERS, WELDED

• Acme Industries, Inc., Jackson, Mich.
American Locomotive Co., Alco Products Div., New York, N. Y.
• Baker Ice Machine Co., Inc., Omaha, Neb.
Biggs Boiler Works Co., E. Akron, O.
Chicago Nipple Mfg. Co., Chicago, Ill.
Clow & Sons, James B., Chicago, Ill.
Columbian Steel Tank Co., Kansas City, Mo.
• Crane Co., Chicago, Ill.
Downingtown Iron Works, Downingtown, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Frick Co., Waynesboro, Pa.
• Grinnell Co., Inc., Providence, R. I.
International Engineering Wks., Inc., Framingham, Mass.
Kellogg Co., M. W., The, New York, N. Y.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Limbert & Co., Geo. B., Chicago, Ill.
Lumsden & Van Stone Co., South Boston, Mass.
• Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
National Valve & Mfg. Co., Pittsburgh, Pa.
• Naylor Pipe Co., Chicago, Ill.
Ohio Pipe Bending & Mach. Co., Cleveland, O.
Oiljack Mfg. Co., Inc., Montclair, N. J.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw-Knox Co., Pittsburgh, Pa.
Rempe Co., Chicago, Ill.
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Semet-Solvay Engineering Corp., New York, N. Y.
Shaw Co., Benjamin F., Wilmington, Del.
Shaw-Kendall Engineering Co., Toledo, O.
Vilter Mfg. Co., Milwaukee, Wis.
• Walworth Co., New York, N. Y.
Western Piping & Engineering Co., San Francisco, Calif.
Whitlock Mfg. Co., Hartford, Conn.
Zallea Brothers & Johnson, Wilmington, Del.

HEADS, EXHAUST, FOR PIPE LINES

Aeolus Dickinson, Chicago, Ill.
Cochrane Corp., Philadelphia, Pa.
• Crane Co., Chicago, Ill.
Dickinson, Aeolus, Chicago, Ill.

Flori Pipe Co., The, St. Louis, Mo.
Hoppes Mfg. Co., Springfield, O.
• Kieley & Mueller, Inc., North Bergen, N. J.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Wright-Austin Co., Detroit, Mich.

HEADS, SPRINKLER

• Binks Mfg. Co., Chicago, Ill.
Cleghorn Co., Boston, Mass.
• Grinnell Co., Inc., Providence, R. I.
Hodgman Mfg. Co., Taunton, Mass.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Ross Sprinkler Co., Pasadena, Calif.

HEAT EXCHANGERS

See Chillers, Water; Condensers, Refrigerating; Exchangers, Heat; Surface, Cooling; Surface, Heating

HEATERS, AIR, DIRECT FIRED

• Air Devices, Inc., New York, N. Y.
• Airtherm Mfg. Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Campbell Heating Co., Des Moines, Ia.
Campbell Heating Co., E. K., Kansas City, Mo.
Columbus Heating & Ventilating Co., Columbus, O.
Despatch Oven Co., Minneapolis, Minn.
• Dravo Corp., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
Electromode Corp., Div. of American Foundry Equipment Co., Mishawaka, Ind.
General Gas Light Co., Kalamazoo, Mich.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Hare Engineering Co., Detroit, Mich.
• Jackson & Church Co., Saginaw, Mich.
Lee Engineering Co., Youngstown, O.
Magiri Foundry & Furnace Wks., P. H., Bloomington, Ill.
McCann Furnace Co., Cleveland, O.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National Gas Burners, Div. of Mid-Continent Metal Products Co., Chicago, Ill.
National Heater Co., Minneapolis, Minn.
National Mfg. & Engineering Co., Detroit, Mich.
Nelson Co., Detroit, Mich.
Palmer Mfg. Corp., Phoenix, Ariz.
Ross Engineering Corp., J. O., New York, N. Y.
Smith, Inc., James Campbell, Cleveland, O.
• Surface Combustion Corp., Toledo, O.
XXth Century Heating and Ventilating Co., Akron, O.
Whiting Corp., Harvey, Ill.
Williams, Inc., F. C., Dearborn, Mich.

HEATERS, CONVECTION

See Radiation, Convection Type

HEATERS, DUCT, ELECTRIC

Consolidated Car-Heating Co., Inc., Albany, N. Y.
Despatch Oven Co., Minneapolis, Minn.
General Electric Co., Schenectady, N. Y.
Harvey-Whipple, Inc., Springfield, Mass.
Hynes Electric Heating Co., Camden, N. J.
• Tenney Engineering, Inc., Newark, N. J.
Trent Co., Harold E., Philadelphia, Pa.
Westinghouse Electric Corp., Heating Section, Meadville, Pa.
• Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, DUCT, GAS

Beck Engineering Combustion Kompany, St. Louis, Mo.
Bryant Heater Co., The, Cleveland, O.
• Dravo Corp., Pittsburgh, Pa.
General Gas Light Co., Kalamazoo, Mich.
International Sales Co., San Francisco, Calif.
Kehm Corp., The, Chicago, Ill.
Palmer Mfg. Corp., Phoenix, Ariz.
Payne Furnace & Supply Co., Inc., Beverly Hills, Calif.
Reznor Mfg. Co., Mercer, Pa.
Royal Air Conditioning Equipment Co., Alhambra, Calif.
• Surface Combustion Corp., Toledo, O.
XXth Century Heating and Ventilating Co., Akron, O.
Utility Appliance Corp., Los Angeles, Calif.

HEATERS, FEEDWATER

See Deaerators

HEATERS, GASOLINE FIRED (FOR AIRCRAFT AND PORTABLE GROUND USE)

Anchor Post Fence Co., Fluid Heat Div., Baltimore, Md.
Selas Corp of America, Strato-Heater Div., Philadelphia, Pa.
Solar Aircraft Co., San Diego, Calif.
Stewart-Warner Corp., Chicago, Ill.
• Surface Combustion Corp., Toledo, O.

HEATERS, INDIRECT, SUBMERGED

• American District Steam Co., North Tonawanda, N. Y.
• Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Frank Heaters, Inc., Paterson, N. J.
• General Fittings Co., Providence, R. I.
Richmond Engineering Co., Inc., Richmond, Va.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Taco Heaters, Inc., New York, N. Y.
Western Blower Co., Seattle, Wash.

HEATERS, STRIP AND IMMERSION, ELECTRIC

American Instrument Co., Silver Spring, Md.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Cutler-Hammer, Inc., Milwaukee, Wis.
Electric Arc, Inc., Newark, N. J.
Falcon Equipment Co., New Brighton, Pa.
General Electric Co., Schenectady, N. Y.
H. & A. Co., Buffalo, N. Y.
Hynes Electric Heating Co., Camden, N. J.
Landis & Gyr, Inc., New York, N. Y.
Red Spot Electric Co., Tacoma, Wash.
Trent Co., Harold E., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Westinghouse Electric Corp., Heating Section, Meadville, Pa.
• Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, UNIT, ELECTRIC HEATING ELEMENT

Consolidated Car-Heating Co., Inc., Albany, N. Y.
Electromode Corp., Div. American Foundry Equipment Co., Mishawaka, Ind.
General Electric Co., Schenectady, N. Y.
Hynes Electric Heating Co., Camden, N. J.
• Ilg Electric Ventilating Co., Chicago, Ill.
Red Spot Electric Co., Tacoma, Wash.
Samson-United Corp., Rochester, N. Y.
Trent Co., Harold E., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Westinghouse Electric Corp., Heating Section, Meadville, Pa.
• Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, UNIT, GAS FIRED

• Airtherm Mfg. Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
Automatic Gas Equipment Co., Pittsburgh, Pa.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Bryant Heater Co., The, Cleveland, O.
Clow & Sons, James B., Chicago, Ill.
• Dravo Corp., Pittsburgh, Pa.
General Gas Light Co., Kalamazoo, Mich.
• Ilg Electric Ventilating Co., Chicago, Ill.
International Sales Co., San Francisco, Calif.
Lee Engineering Co., Youngstown, O.
• McCord Corp., Detroit, Mich.
• Mueller Furnace Co., L. J., Milwaukee, Wis.
Palmer Mfg. Corp., Phoenix, Ariz.
Reznor Mfg. Co., Mercer, Pa.
• Surface Combustion Corp., Toledo, O.
Utility Appliance Corp., Los Angeles, Calif.
• Zink Co., John, Tulsa, Okla.

HEATERS, UNIT, OIL FIRED

• Airtherm Mfg. Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
Beck Engineering Combustion Kompany, St. Louis, Mo.
• Dravo Corp., Pittsburgh, Pa.
Hare Engineering Co., Detroit, Mich.
Lee Engineering Co., Youngstown, O.

HEATERS, UNIT, STEAM AND HOT WATER

• Airtherm Mfg. Co., St. Louis, Mo.
American Blower Corp., Detroit, Mich.
Bayley Blower Co., Milwaukee, Wis.
Beacon-Morris Corp., Boston, Mass.
Bern's Specialty Mfg. Co., Chicago, Ill.
• Bishop & Babcock Mfg. Co., Cleveland, O.
Blower Application Co., Milwaukee, Wis.
• Buffalo Forge Co., Buffalo, N. Y.
• Burnham Boiler Corp., Irvington, N. Y.
Caldwell Co., Wm. J., Washington, D. C.
Campbell Heating Co., E. K., Kansas City, Mo.
• Carrier Corp., Syracuse, N. Y.
Champion Unit Heater Co., Chicago, Ill.
• Clarage Fan Co., Kalamazoo, Mich.
• Dunham Co., C. A., Chicago, Ill.
Fedders-Quigan Corp., Buffalo, N. Y.
• Grinnell Co., Inc., Providence, R. I.
Hartzell Propeller Fan Co., Piqua, O.
Harvey-Whipple, Inc., Springfield, Mass.
Hastings Air Conditioning Co., Hastings, Neb.
• Ilg Electric Ventilating Co., Chicago, Ill.
Industrial Mfg. & Engrg. Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
• Johnson Fan & Blower Corp., Chicago, Ill.
King Ventilating Co., Owatonna, Minn.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
• Marlo Coil Co., St. Louis, Mo.
• McCord Corp., Detroit, Mich.
• McQuay, Inc., Minneapolis, Minn.
• Modine Mfg. Co., Racine, Wis.
• Murray Mfg. Co., D. J., Wausau, Wis.
• National Radiator Co., The, Johnstown, Pa.
Nelson Corp., Herman, Moline, Ill.
• Nesbitt, Inc., John J., Philadelphia, Pa.
New York Blower Co., Chicago, Ill.
Niagara Blower Co., New York, N. Y.
Refrigeration Economics Co., Inc., Canton, O.

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Richmond Engineering Co., Inc., Richmond, Va.
Rome-Turney Radiator Co., Rome, N. Y.
Ross Engineering Corp., J. O., New York, N. Y.
Semco Mfg. Co., Nashville, Tenn.
• Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Sturtevant Co., B. F., Boston, Mass.
Super Radiator Corp., Div. of Westinghouse Electric Corp., Minneapolis, Minn.
• Tenney Engineering, Inc., Newark, N. J.
• Trane Co., The, La Crosse, Wis.
• United States Air Conditioning Corp., Minneapolis, Minn.
• Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
• Wing Mfg. Co., L. J., New York, N. Y.
• Young Radiator Co., Racine, Wis.

HEATERS, VENTILATION

See Ventilators, Unit

HEATERS, WATER, CAST IRON, COAL FIRED

Adams Co., The, Dubuque, Ia.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
• Burnham Boiler Corp., Irvington, N. Y.
Cleghorn Co., Boston, Mass.
• Crane Co., Chicago, Ill.
Eastern Foundry Co., Peerless Heater Div., Boyertown, Pa.
• Gehl Bros. Mfg. Co., West Bend, Wis.
Glo Heat Equipment Co., New York, N. Y.
Pittsburgh Water Heater Corp., Pittsburgh, Pa.
International Heater Co., Utica, N. Y.
• National Radiator Co., The, Johnstown, Pa.
Prox Co., Inc., Frank, Terre Haute, Ind.
• Smith Co., Inc., H. B., The, Westfield, Mass.
Spencer Heater Div., The Aviation Corp., Williamsport, Pa.
United States Radiator Corp., Detroit, Mich.
Weil-McLain Co., Chicago, Ill.

HEATERS, WATER, ELECTRIC

• Crane Co., Chicago, Ill.
Edison General Electric Appliance Co., Inc., Chicago, Ill.
Glo Heat Equipment Co., New York, N. Y.
Hotstream Heater Co., Cleveland, O.
Hynes Electric Heating Co., Camden, N. J.
Red Spot Electric Co., Tacoma, Wash.
Trent Co., Harold E., Philadelphia, Pa.
Westinghouse Electric Corp., Heating Section, Meadville, Pa.

HEATERS, WATER, GAS FIRED

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Birchfield Boiler, Inc., Tacoma, Wash.
Bryant Heater Co., The, Cleveland, O.
• Crane Co., Chicago, Ill.
Dahlquist Mfg. Co., Inc., Somerville, Mass.
Eastern Foundry Co., Peerless Heater Div., Boyertown, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
Gerstein & Cooper Co., South Boston, Mass.
Glo Heat Equipment Co., New York, N. Y.
Handley Brown Heater Co., Jackson, Mich.
Hotstream Heater Co., Cleveland, O.
International Engineering Wks., Inc., Framingham, Mass.
Kresno-Stamm Mfg. Co., New York, N. Y.
Montgomery Bros., San Francisco, Calif.
• Mueller Furnace Co., L. J., Milwaukee, Wis.
Pittsburgh Water Heater Corp., Pittsburgh, Pa.
Richmond Radiator Co., Uniontown, Pa.
Rheem Mfg. Co., San Francisco, Calif.
Rotary Mfg. Co., Los Angeles, Calif.
Ruud Mfg. Co., Pittsburgh, Pa.
Schoedinger, F. O., Columbus, O.
Sellers Engineering Co., Chicago, Ill.
• Smith Co., Inc., H. B., The, Westfield, Mass.
Stout & Sons, David, St. Louis, Mo.
United States Radiator Corp., Detroit, Mich.

HEATERS, WATER, INDIRECT

Akwa Heaters, Inc., New York, N. Y.
• American District Steam Co., North Tonawanda, N. Y.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
• Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bryan Steam Corp., Peru, Ind.
Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Downingtown, Pa.
Ferguson & Lange Foundry Co., Chicago, Ill.
Frank Heaters, Inc., Paterson, N. J.
• General Fittings Co., Providence, R. I.
Hotstream Heater Co., Cleveland, O.
Howard Iron Works & Alberger Heater Co., Buffalo, N. Y.
Kehm Corp., The, Chicago, Ill.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Taco Heaters, Inc., New York, N. Y.
• Thrush & Co., H. A., Peru, Ind.
Triplex Heating Specialty Co., Peru, Ind.
Vapor Car Heating Co., Inc., Chicago, Ill.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.

HEATERS, WATER, INDIRECT, COMBINATION TANK AND TANKLESS

• Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
• Burnham Boiler Corp., Irvington, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Gerstein & Cooper Co., South Boston, Mass.
Hotstream Heater Co., Cleveland, O.
Howard Iron Works & Alberger Heater Co., Buffalo, N. Y.
Peerless of America, Inc., Chicago, Ill.
Richmond Engineering Co., Inc., Richmond, Va.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
• Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Peru, Ind.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.

HEATERS, WATER, OIL FIRED

Aeroil Products Co., West New York, N. J. (portable)
• Air Devices, Inc., New York, N. Y.
Aldrich Co., The, Wyoming, Ill.
Auburn Burner Co., Auburn, Ind.
Bethlehem Foundry & Machine Co., Bethlehem, Pa.
Birchfield Boiler, Inc., Tacoma, Wash.
Century Engineering Corp., Cedar Rapids, Ia.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Dahlquist Mfg. Co., Inc., Somerville, Mass.
Electrol Mfg. Co., Passaic, N. J.
Gerstein & Cooper Co., South Boston, Mass.
Glo Heat Equipment Co., New York, N. Y.
Hotstream Heater Co., Cleveland, O.
International Engineering Wks., Inc., Framingham, Mass.
Johnson Co., S. T., Oakland, Calif.
Kleen-Heet, Inc., Chicago, Ill.
Kresno-Stamm Mfg. Co., New York, N. Y.
Littleford Bros., Cincinnati, O.
Lonergan Mfg. Co., Albion, Mich.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Nu-Way Corp., Rock Island, Ill.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
Pan-American Engineering Co., Berkeley, Calif.
• Petroleum Heat & Power Co., Stamford, Conn.
Preferred Utilities Mfg. Corp., New York, N. Y.
Ray Oil Burner Co., San Francisco, Calif.
Reif-Rexoil, Inc., Buffalo, N. Y.
Scott-Newcomb, Inc., St. Louis, Mo.
• Smith Co., Inc., H. B., The, Westfield, Mass.
Spencer Heater Div., The Aviation Corp. Williamsport, Pa.
United States Radiator Corp., Detroit, Mich.
Vapor Car Heating Co., Inc., Chicago, Ill.
Viking Mfg. Corp., Cleveland, O.
Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
York-Heat Div., York-Shipley, Inc., York, Pa.

HEATERS, WATER, STEAM, INSTANTANEOUS

Akwa Heaters, Inc., New York, N. Y.
• American District Steam Co., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
• Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Coe Mfg. Co., Painesville, O.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Cyclotherm Corp., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Downingtown, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
Frank Heaters, Inc., Paterson, N. J.
• General Fittings Co., Providence, R. I.
Gerstein & Cooper Co., South Boston, Mass.
Hasco Valve & Machine Co., Milwaukee, Wis.
Heat Transfer Products, Inc., Carbondale, Pa.
Howard Iron Wks. & Alberger Heater Co., Buffalo, N. Y.
• Johnson Corp., Three Rivers, Mich.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Montgomery Bros., San Francisco, Calif.
Marion Machine Foundry & Supply Co., Marion, Ind.
National Pipe Bending Co., New Haven, Conn.
O'Brien Steam Specialty Co., Syracuse, N. Y.
• Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pick Mfg. Co., West Bend, Wis. (direct steam injection)
Quaker City Iron Works, Philadelphia, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Super Radiator Corp., Minneapolis, Minn.
Swartwout Co., Cleveland, O.
Taco Heaters, Inc., New York, N. Y.
Whitlock Mfg. Co., Hartford, Conn.
Zallea Brothers & Johnson, Wilmington, Del.

HEATERS, WATER, STEAM, STORAGE

Akwa Heaters, Inc., New York, N. Y.
• American District Steam Co., North Tonawanda, N. Y.
• Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bros Boiler & Mfg Co., Wm., Minneapolis, Minn.
Brownell Co., Dayton, O.
• Burnham Boiler Corp., Irvington, N. Y.
Davis Engineering Co., Elizabeth, N. J.
Downington Iron Works, Downington, Pa.

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Frank Heaters, Inc., Paterson, N. J.
• General Fittings Co., Providence, R. I.
Gerstein & Cooper Co., South Boston, Mass.
Heat Transfer Products, Inc., Carbondale, Pa.
Howard Iron Wks. & Alberger Heater Co., Buffalo, N. Y.
International Engineering Wks., Inc., Framingham, Mass.
• Johnson Corp., Three Rivers, Mich.
• Kewanee Boiler Corp., Kewanee, Ill.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Manitowoc Boiler Wks., Manitowoc, Wis.
Marion Machine Foundry & Supply Co., Marion, Ind.
National Pipe Bending Co., New Haven, Conn.
O'Brien Steam Specialty Co., Syracuse, N. Y.
• Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Quaker City Iron Works, Philadelphia, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Rotary Mfg. Co., Los Angeles, Calif.
• Schaub Engineering Co., Fred H, Chicago, Ill.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Stout & Sons, David, St. Louis, Mo.
Super Radiator Corp, Minneapolis, Minn.
Vogt Machine Co., Henry, Louisville, Ky.
Warren Electric Appliance Co., Warren, Pa. (Electric)
Waterfilm Boilers, Inc., Jersey City, N. J.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.

HEATERS, WATER, STEEL, COAL FIRED

Aeroil Products Co., West New York, N. J. (portable)
Birchfield Boiler, Inc., Tacoma, Wash.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Catskill Metal Works, Inc., Catskill, N. Y.
• Fitzgibbons Boiler Co., New York, N. Y.
International Engineering Wks., Inc., Framingham, Mass.
Johnson Bros., Inc., Ferrysburg, Mich.
• Kewanee Boiler Corp., Kewanee, Ill.
Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
• National Radiator Co., The, Johnstown, Pa.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
Spencer Heater Div., The Aviation Corp., Williamsport, Pa.
Stokermatic Div., Rheem Mfg. Co., Salt Lake City, Utah.
Terre Haute Boiler Works Co., Terre Haute, Ind.

HEATING BOILERS

See Boilers, Heating

HEATING COILS

See Surface, Heating

HEATING SURFACE

See Surface, Heating

HOSE CLAMPS

See Clamps, Hose

HOSE, METAL AND FITTINGS

Aeroquip Corp., Jackson, Mich.
American Metal Hose Branch, American Brass Co., Waterbury, Conn.
Atlantic Metal Hose Co., Inc., New York, N. Y.
Bendix Aviation Corp., Philadelphia Div., Philadelphia, Pa.
Chicago Metal Hose Corp., Maywood, Ill.
Everhot Products Co., Chicago, Ill.
Packless Metal Products Corp., New Rochelle, N. Y.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Seamlex Co., Inc., Long Island City, N. Y.
Titeflex, Inc., Newark, N. J.
United Metal Hose Co., Inc., Long Island City, N. Y.
Zallea Brothers & Johnson, Wilmington, Del.

HOSE, NON-METAL, AND FITTINGS

Aeroquip Corp., Jackson, Mich.
American Ventilating Hose Co., New York, N. Y.
Boston Woven Hose & Rubber Co., Boston, Mass.
Goodrich Co., B. F., Akron, O.
DeVilbiss Co., The, Toledo, O.
Independent Pneumatic Tool Co., Chicago, Ill.
Republic Rubber Div., Lee Rubber and Tire Corp., Youngstown, O.
Resistoflex Corp., Belleville, N. J.
Thermoid Rubber, Div. of Thermoid Co., Trenton, N. J.
• Tinnerman Products, Inc., Cleveland, O. (clamps)
United States Rubber Co., New York, N. Y.

HOT WATER HEATING SYSTEMS

See Systems, Heating, Hot Water

HOSE VENTILATING

See Ducts and Duct Fittings, Prefabricated, Non-Metallic

HOT WATER HEATING SYSTEMS, BALANCING ELBOW FOR

See Elbows, Balancing, for Hot Water Heating Systems

HOT WATER PRESSURE REGULATORS

See Regulators, Pressure, Hot Water Heating Systems

HOUSINGS, FAN, CENTRIFUGAL

(Housing only—not complete fans)

Air Controls, Inc., Cleveland, O.
Brundage Co., The, Kalamazoo, Mich.
• Burden Fan & Blower Co., Los Angeles, Calif.
• Clarage Fan Co., Kalamazoo, Mich.
• Commercial Shearing & Stamping Co., Youngstown, O.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
• Detroit Stamping Co., Detroit, Mich.
Hastings Air Conditioning Co., Inc., Hastings, Neb.
• Lau Blower Co., Dayton, O.
Martin Fan & Blower Co., Chicago, Ill.
National Mfg. & Engineering Co., Detroit, Mich.
Northern Blower Co., Cleveland, O.
Royal Air Conditioning Equipment Co., Alhambra, Calif.
Sandberg Sheet Metal Works, Portland, Ore.
Schwitzer-Cummins Co., Indianapolis, Ind.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
Torrington Mfg. Co., Torrington, Conn.
• United States Air Conditioning Corp., Minneapolis, Minn.
Utica Products, Inc., Utica, N. Y.
Viking Air Conditioning Corp., Cleveland, O.

HOUSINGS, FAN, PROPELLER

(Housings only—not complete fans)

• Commercial Shearing & Stamping Co., Youngstown, O.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
• De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.

HUMIDIFIERS, CENTRAL PLANT

• Air & Refrigeration Corp., New York, N. Y.
American Blower Corp., Detroit, Mich.
• Armstrong Machine Wks., Three Rivers, Mich.
Badger Corp., Milwaukee, Wis.
Bahnson Co., Winston-Salem, N. C.
• Barber-Colman Co., Rockford, Ill.
• Carrier Corp., Syracuse, N. Y.
• Clarage Fan Co., Kalamazoo, Mich.
Cleveland Humidifier Co., Cleveland, O.
• Farr Co., Los Angeles, Calif.
• Johnson Service Co., Milwaukee, Wis.
Mellish & Murray Co., Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
National Engineering & Mfg. Co., Kansas City, Mo.
Parks-Cramer Co., Fitchburg, Mass.
• Powers Regulator Co., Chicago, Ill.
Research Corp., New York, N. Y.
Ross Engineering Corp., J. O., New York, N. Y.
Skuttle Mfg. Co., Detroit, Mich.
Steamaire Co., Cincinnati, O.
Strandwitz & Co., Inc., W. J., Camden, N. J.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
• Surface Combustion Corp., Toledo, O.
• Trane Co., The, La Crosse, Wis.
Viking Air Conditioning Corp., Cleveland, O.
Vilter Mfg. Co., Milwaukee, Wis.

HUMIDIFIERS, DIRECT, SPRAY HEAD

• Air & Refrigeration Corp., New York, N. Y.
American Moistening Co., Providence, R. I.
Anetsberger Bros., Chicago, Ill.
• Armstrong Machine Works, Three Rivers, Mich.
Bahnson Co., Winston-Salem, N. C.
• Binks Mfg. Co., Chicago, Ill.
Blower Application Co., Milwaukee, Wis.
• Buffalo Forge Co., Buffalo, N. Y.
• Chelsea Products, Inc., Irvington, N. J.
Drying Systems, Inc., Chicago, Ill.
• Grinnell Co., Inc., Providence, R. I.
International Moistening Co., Providence, R. I.
Manufacturers Machine Co., North Andover, Mass.
Marley Co., Inc., The, Kansas City, Kans.
• Murray Mfg. Co., D. J., Wausau, Wis.
New York Blower Co., Chicago, Ill.
Parks-Cramer Co., Fitchburg, Mass.
Pfening Co., Fred D., Columbus, O.
Rhode Island Humidifier & Ventilating Co., Boston, Mass.
Ross Sprinkler Co., Pasadena, Calif.
Somers, Inc., H. J., Detroit, Mich.
Spray Engineering Co., Somerville, Mass.
• Spraying Systems Co., Chicago, Ill.
Steamaire Co., Cincinnati, O.
Supreme Electric Products Corp., Rochester, N. Y.
• Trane Co., The, LaCrosse, Wis.
Utility Appliance Corp., Los Angeles, Calif.
Water Cooling Corp., New York, N. Y.

HUMIDIFIERS FOR RADIATORS AND CONVECTORS

Bridgeport Brass Co., Bridgeport, Conn.
Lowell Air Conditioning Corp., Philadelphia, Pa.
• Maid-O'-Mist, Inc., Chicago, Ill.
Patent Novelty Co., Fulton, Ill.
Skilbeck Mfg. Co., Kenosha, Wis.
Techtmann Industries, Inc., Milwaukee, Wis.

HUMIDIFIERS, RADIATOR VENT VALVE

• Maid-O'-Mist, Inc., Chicago, Ill.
Skilbeck Mfg. Co., Kenosha, Wis.

HUMIDIFIERS, UNIT, ROOM TYPE (Without Heating)

Kauffman Air Conditioning Corp., St. Louis, Mo.
Lion Mfg. Corp., Chicago, Ill.

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• Murray Mfg. Co., D. J., Wausau, Wis.
National Engineering & Mfg. Co., Kansas City, Mo.
Norwood Filtration Co., The, Florence, Mass.
Skilbeck Mfg. Co., Kenosha, Wis.
Somers, Inc., H. J., Detroit, Mich.
• Spraying Systems Co., Chicago, Ill.
Standard Engineering Wks., Pawtucket, R. I.
Steamaire Co., Cincinnati, O.
• United States Air Conditioning Corp., Minneapolis, Minn.
Water Cooling Corp., New York, N. Y.

HUMIDIFYING RADIATORS

See Radiators, Humidifying

HUMIDISTATS

American Moistening Co., Providence, R. I.
• Autempco Corp., New York, N. Y.
Bahnson Co., Winston-Salem, N. C.
• Barber-Colman Co., Rockford, Ill.
Bristol Co., Waterbury, Conn.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
H-B Instrument Co., Philadelphia, Pa.
• Johnson Service Co., Milwaukee, Wis.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Parks-Cramer Co., Fitchburg, Mass.
• Penn Electric Switch Co., Goshen, Ind.
• Powers Regulator Co., Chicago, Ill.
Standard Engineering Wks., Pawtucket, R. I.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• White-Rodgers Electric Co., St. Louis, Mo.

HUMIDITY RECORDERS

See Recorders, Humidity

HUMIDITY AND TEMPERATURE CONTROLS

See Humidistats; Recorder-Controllers; Thermostats

HYDRAULIC PIPE PUSHERS

See Pushers, Pipe, Hydraulic

HYDRAULIC SPEED CHANGERS

See Changers, Speed, Hydraulic Coupling

HYGROMETERS

American Moistening Co., Providence, R. I.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Elmer & Amend, New York, N. Y.
Fee and Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hill, E. Vernon, Chicago, Ill.
International Moistening Co., Providence, R. I.
• Johnson Service Co., Milwaukee, Wis.
• Leeds & Northrup Co., Philadelphia, Pa. (recording)
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Co., Cincinnati (Norwood), O.
Parks-Cramer Co., Fitchburg, Mass.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.

HYGROSTATS

See Humidistats

IMMERSION THERMOSTATS

See Thermostats, Immersion

INDICATING THERMOMETERS

See Thermometers, Indicating

INDICATOR-CONTROLLERS, PRESSURE

Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
• Cash Co., A. W., Decatur, Ill.
Foxboro Co., Foxboro, Mass.
• Hays Corp., Michigan City, Ind.
• Leeds & Northrup Co., Philadelphia, Pa.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Moore Products Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Wheelco Instruments Co., Chicago, Ill.

INDICATOR-CONTROLLERS, RELATIVE HUMIDITY

• Barber-Colman Co., Rockford, Ill.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
• Johnson Service Co., Milwaukee, Wis.
• Leeds & Northrup Co., Philadelphia, Pa.
Mason-Neilan Regulator Co., Boston, Mass.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.

INDICATOR-CONTROLLERS, TEMPERATURE

Bailey Meter Co., Cleveland, O.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
• Cash Co., A. W., Decatur, Ill.
Foxboro Co., Foxboro, Mass.
• Illinois Testing Laboratories, Inc., Chicago, Ill.
• Johnson Service Co., Milwaukee, Wis.
• Leeds & Northrup Co., Philadelphia, Pa.
Mason-Neilan Regulator Co., Boston, Mass.
Pyrometer Instrument Co., New York, N. Y.
• Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
Wheelco Instruments Co., Chicago, Ill.

INDICATORS, CARBON DIOXIDE, BOILER ROOM

For portable CO_2 analyzers, see Analyzers, Carbon Dioxide, Portable

Defender Instrument and Regulator Co., St. Louis, Mo.
Engelhard, Inc., Chas., Newark, N. J.
Ess Instrument Co., Fort Lee, N. J.
• Hays Corp., Michigan City, Ind.
• Leeds & Northrup Co., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Weaver Mfg. Co., Springfield, Ill.

INDICATORS, FLOW

See Meters, Flow

INDICATORS, LIQUID LEVEL

Boston Auto Gage Co., Pittsfield, Mass.
Bristol Co., The, Waterbury, Conn.
• Hays Corp., Michigan City, Ind.
Meriam Instrument Co., The, Cleveland, O.
Petrometer Corp., Long Island City, N. Y.
• Stephens-Adamson Mfg. Co., Aurora, Ill.
• Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
• Yarnall-Waring Co., Philadelphia, Pa.

INDICATORS, SOUND LEVEL

General Electric Co., Schenectady, N. Y.

INDIRECT HEATING SURFACE

See Surface, Heating

INDIRECT WATER HEATERS

See Heaters, Water, Indirect

INDUSTRIAL AIR CONDITIONERS

See Units, Air Conditioning, Industrial Type

INDUSTRIAL DRYERS

See Dryers, Industrial

INSTANTANEOUS WATER HEATERS

See Heaters, Water, Steam, Instantaneous

INSULATION, BOILER AND TANK

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Alfol Insulation Co., Inc., New York, N. Y. (Aluminum foil)
Alton Mineral Wool Insulation Co., Alton, Ill.
Armstrong Cork Co., Lancaster, Pa. (85% Magnesia)
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Bird-Archer Co., Philadelphia, Pa.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Cork Import Corp., New York, N. Y. (Cork, mineral wool board)
Cork Insulation Co., Inc., New York, N. Y. (Cork)
Eagle-Picher Co., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa. (Magnesia)
• Grant Wilson, Inc., Chicago, Ill.
Green Fire Brick Co., A. P., Mexico, Mo.
Hinde & Dauch Paper Co., Sandusky, O.
International Vermiculite Co., Girard, Ill.
Jamar Co., Walker, Duluth, Minn.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y. (Asbestos)
Keasbey & Mattison Co., Ambler, Pa.
Krehbiel Co., J. H., Chicago, Ill.
• Mundet Cork Corp., Brooklyn, N. Y. (Cork)
Munn and Steele, Inc., Newark, N. J.
National Gypsum Co., Buffalo, N. Y. (Rock wool)

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Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos and magnesia)
Owens-Corning Fiberglas Corp., Toledo, O. (Blanket)
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Plant Rubber & Asbestos Works, San Francisco, Calif.
Poe Co., C. W., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y. (Blanket, block, cement)
Reynolds Metals Co., Richmond, Va.
Robinson Insulation Co., Great Falls, Mont.
Rock Fleece Co., El Paso, Tex.
Ruberoid Co., New York, N. Y. (Asbestos, magnesia)
Sall Mountain Co., Chicago, Ill.
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Elizabeth, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Telsit Insulation Co., Bronx, N. Y.
Tennessee Products Corp., Nashville, Tenn.
Therminsul Corp., Kalamazoo, Mich. (Felted block)
Union Asbestos & Rubber Co., Cicero, Ill.
United Cork Co., Kearny, N. J. (Cork)
Universal Zonolite Insulation Co., Chicago, Ill. (Plastic)
Walker Jamar Co., Duluth, Minn.
• Wilson, Inc., Grant, Chicago, Ill.

INSULATION, BUILDING

Acme Asbestos Covering & Flooring Co., Chicago, Ill. (Rock wool)
Air-O-Cel Industries, Inc., Detroit, Mich.
Alfol Insulation Co., New York, N. Y. (Aluminum foil)
Alton Mineral Wool Insulation Co., Alton, Ill.
• Aluminum Co. of America, Pittsburgh, Pa.
American Flange & Mfg. Co., Inc., New York, N. Y. (Metal sheets)
American Hair & Felt Co., Chicago, Ill. (Hair felt)
Armstrong Cork Co., Lancaster, Pa. (Corkboard, fibreboard)
Bache & Co., Semon, New York, N. Y. (Glass wool)
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Rock wool)
Carney Rockwool Co., Mankato, Minn.
Celotex Corp., The, Chicago, Ill.
Certain-teed Products Corp., New York, N. Y. (Board, reflective)
Chamberlin Co. of America, Detroit, Mich. (Rock wool)
Cork Import Corp., New York, N. Y. (Cork, mineral wool board)
Cork Insulation Co., Inc., New York, N. Y. (Corkboard)
Doheny Co., John J., Belmont, Mass. (Blanket)
Dry-Zero Corp., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O. (Mineral wool, blankets, batts, granulated, loose)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Fir-Tex Insulating Board Co., St. Helens, Ore. (Wood fibreboard)
Flintkote Co., The, New York, N. Y. (Fiber board and rock wool)
General Insulating Products Co., Brooklyn, N. Y. (Rock wool)
• Grant Wilson, Inc., Chicago, Ill. (Rockwool)
Hinde & Dauch Paper Co., Sandusky, O.
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn. (Wood fibre)
Insul-Wool Insulation Corp., Wichita, Kans.
International Vermiculite Co., Girard, Ill. (Loose fill)
Johns-Manville, New York, N. Y. (Rock wool and wood fibreboard)
Johnston Tin Foil & Metal Co., St. Louis, Mo. (Foil, aluminum, tin, lead)
Keasbey Co., Robert A., New York, N. Y. (Rock wool)
Keasbey & Mattison Co., Ambler, Pa. (Asbestos)
Kimberly-Clark Corp., Neenah, Wis.
Ludowici-Celadon Co., Chicago, Ill. (wool)
Masonite Corp., Cellufoam Products Div., Chicago, Ill.
Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
Multi-Cell Sales Corp., Minneapolis, Minn. (Blanket, quilted newspaper)
• Mundet Cork Corp., Brooklyn, N. Y. (Cork)
Munn & Steele, Inc., Newark, N. J.
National Gypsum Co., Buffalo, N. Y.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Owens-Corning Fiberglas Corp., Toledo, O.
Pacific Lumber Co., The, San Francisco, Calif.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Plant Rubber & Asbestos Works, San Francisco, Calif.
Plastergon Wall Board Co., Buffalo, N. Y. (Rigid board)
Poe Co., C. W., Cleveland, O.
Refractory & Insulation Corp., New York, N. Y. (Rock, slag wool)
Reynolds Metal Co., Richmond, Va.
Robinson Insulation Co., Great Falls, Mont.
Rock Fleece Co., El Paso, Tex.
Ruberoid Co., New York, N. Y. (Mineral wool)
Russell Co., F. C., The, Cleveland, O.
Semon Bache & Co., New York, N. Y. (Glass wool)
Silvercote Products, Inc., Chicago, Ill.
Specialty Converters, Inc., East Braintree, Mass. (Reflective insulation)
Sprayo-Flake Co., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill. (Asbestos, hairfelt)
Standard Lime & Stone Co., Baltimore, Md. (Rock wool)
Tennessee Products Corp., Nashville, Tenn.
Therminsul Corp., Kalamazoo, Mich. (Rock wool block)
Truscon Steel Co., Youngstown, O. (Insulation board sealed between metal sheets)
United Cork Companies, Lyndhurst, N. J. (Cork)
United States Gypsum Co., Chicago, Ill. (Wool and board)
United States Mineral Wool Co., Chicago, Ill. (Mineral wool)
Universal Gypsum & Lime Co., Chicago, Ill. (Loose fill)
Universal Zonolite Insulation Co., Chicago, Ill. (Loose fill)
Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Western Mineral Products Co., Omaha 1, Nebr.
Wilson & Co., Chicago, Ill. (Board)
• Wilson, Inc., Grant, Chicago, Ill. (Rock wool)
Wood Conversion Co., St. Paul, Minn.

INSULATION, CEILING AND WALL, SOUND DEADENING

Acoustical treatment only—for thermal insulation, see Insulation, Building

Air-O-Cel Industries, Inc., Detroit, Mich.
Alton Mineral Wool Insulation Co., Alton, Ill.
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Baldwin-Hill Co., Trenton, N. J.
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Celotex Corp., The, Chicago, Ill.
Doheny Co., John J., Belmont, Mass.
Felters Co., Inc., Boston, Mass.
Fir-Tex Insulating Board Co., St. Helens, Ore.
General Insulating Products Co., Brooklyn, N. Y.
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn.
Insul-Wool Insulation Corp., Wichita, Kans.
Inter-Coastal Paint Corp., East St. Louis, Ill.
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Masonite Corp., Chicago, Ill. (Fibreboard)
• Mundet Cork Corp., Brooklyn, N. Y.
National Gypsum Co., Buffalo, N. Y.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Owens-Corning Fiberglas Corp., Toledo, O.
Pacific Lumber Co., The, San Francisco, Calif.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Plant Rubber & Asbestos Works, San Francisco, Calif.
Reynolds Metals Co., Richmond, Va.
Robinson Insulation Co., Great Falls, Mont.
Sprayo-Flake Co., Chicago, Ill.
Technical Ply-Woods, Chicago, Ill.
Therminsul Corp., Kalamazoo, Mich.
United States Gypsum Co., Chicago, Ill.
Universal Zonolite Insulation Co., Chicago, Ill.
Western Silicair Products, Inc., Burbank, Calif.
Wood Conversion Co., St. Paul, Minn.

INSULATION, DUCT, SOUND DEADENING

For application inside duct

American Hair & Felt Co., Chicago, Ill.
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Celotex Corp., The, Chicago, Ill.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felters Co., Inc., Boston, Mass.
• Grant Wilson, Inc., Chicago, Ill.
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Kimberly-Clark Corp., Neenah, Wis.
Moore Co., Goodloe E., Danville, Ill.
Mortell Co., J. W., Kankakee, Ill.
Owens-Corning Fiberglas Corp., Toledo, O.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Plant Rubber & Asbestos Works, San Francisco, Calif.
Reynolds Metals Co., Richmond, Va.
Telsit Insulation Co., Bronx, N. Y.
United States Rubber Co., New York, N. Y.
Universal Zonolite Insulation Co., Chicago, Ill.
Western Felt Works, Chicago, Ill.
Western Silicair Products, Inc., Burbank, Calif.
• Wilson, Inc., Grant, Chicago, Ill.

INSULATION, DUCT, THERMAL

Acme Asbestos Covering & Flooring Co., Chicago, Ill. (Asbestos)
Air-O-Cel Industries, Inc., Detroit, Mich.
Alfol Insulation Co., New York, N. Y. (Aluminum foil)
American Flange & Mfg. Co., Inc., New York, N. Y. (Metal sheets)
American Hair & Felt Co., Chicago, Ill. (Hair felt)
Armstrong Cork Co., Lancaster, Pa. (Corkboard, fibreboard)
Arrowhead Rubber Co., Los Angeles, Calif.
Baldwin-Hill Co., Trenton, N. J.
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Asbestos)
Celotex Corp., The, Chicago, Ill.
Cork Import Corp., New York, N. Y. (Cork, mineral wool board)
Cork Insulation Co., Inc., New York, N. Y. (Cork board)

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Dry-Zero Corp., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O. (Mineral wool blankets)
Ehret Magnesia Mfg. Co., Valley Forge, Pa. (Cork, magnesia, hair felt)
Felters Co., Inc., Boston, Mass. (Wool felt)
Fir-Tex Insulating Board Co., St. Helens, Ore. (Wood fibreboard)
General Insulating Products Co., Brooklyn, N. Y. (Acoustic rock wool)
• Grant Wilson, Inc., Chicago, Ill.
Hinde & Dauch Paper Co., Sandusky, O.
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn. (Wood fibre)
International Vermiculite Co., Girard, Ill. (Block)
Johns-Manville, New York, N. Y. (Rock cork, asbestos)
Keasbey Co., Robert A., New York, N. Y. (Asbestos and cork)
Keasbey & Mattison Co., Ambler, Pa. (Asbestos)
Kennedy, Inc., David E., Brooklyn, N. Y.
Keystone Asphalt Products Co., Chicago, Ill.
Kimberly-Clark Corp., Neenah, Wis.
Masonite Corp., Chicago, Ill.
Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
Mortell Co., J. W., Kankakee, Ill. (Plastic cork coating)
• Mundet Cork Corp., Brooklyn, N. Y. (Cork)
Munn and Steele, Inc., Newark, N. J.
National Gypsum Co., Buffalo, N. Y. (Block)
Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos and wool felt)
Owens-Corning Fiberglas Corp., Toledo, O. (Blanket)
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Plant Rubber & Asbestos Works, San Francisco, Calif.
Poe Co., C. W., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y. (Block, blanket)
Reynolds Metals Co., Richmond, Va.
Robinson Insulation Co., Great Falls, Mont.
Rock Fleece Co., El Paso, Tex.
Ruberoid Co., New York, N. Y. (Asbestos cellular and laminated sheets or blocks)
Sall Mountain Co., Chicago, Ill. (Asbestos)
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Elizabeth, N. J. (Asbestos air cell type)
Sprayo-Flake Co., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill. (Asbestos, hair felt)
Telsit Insulation Co., Bronx, N. Y.
Therminsul Corp., Kalamazoo, Mich. (Rock wool bats, loose and granulated)
United Cork Companies, Lyndhurst, N. J. (Cork)
United States Mineral Wool Co., Chicago, Ill.
Universal Zonolite Insulation Co., Chicago, Ill. (Plastic)
Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Western Felt Wks., Chicago, Ill. (Felt)
Wilson & Co., Chicago, Ill. (Flexible)
• Wilson, Inc., Grant, Chicago, Ill.
Wood Conversion Co., St. Paul, Minn.

INSULATION, PIPE

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Alfol Insulation Co., New York, N. Y. (Aluminum foil)
• American District Steam Co., North Tonawanda, N. Y. (Underground)
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa. (Cork)
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Asbestos, magnesia)
Cork Import Corp., New York, N. Y. (Cork)
Cork Insulation Co., New York, N. Y.
Eagle-Picher Co., Cincinnati, O. (Mineral wool)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
• Grant Wilson, Inc., Chicago, Ill.
Hinde & Dauch Paper Co., Sandusky, O.
International Vermiculite Co., Girard, Ill. (Vermiculite)
Jamar Co., Walker, Duluth, Minn.
Johns-Manville, New York, N. Y. (Asbestos, magnesia, rock cork)
Keasbey Co., Robert A., New York, N. Y. (Asbestos and cork)
Keasbey & Mattison Co., Ambler, Pa. (Asbestos, magnesia)
Masonite Corp., Chicago, Ill.
Monsanto Chemical Co., Merimac Div., Everett, Mass.
Mortell Co., J. W., Kankakee, Ill. (Plastic cork coating)
• Mundet Cork Corp., Brooklyn, N. Y. (Cork)
Munn and Steele, Inc., Newark, N. J.
National Gypsum Co., Buffalo, N. Y. (Moulded)
Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos, magnesia)
Owens-Corning Fiberglas Corp., Toledo, O. (Sectional and flexible)
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Plant Rubber & Asbestos Works, San Francisco, Calif.
Poe Co., C. W., Cleveland, O.
• Porter & Co., Inc., H. W., Newark, N. J. (Underground)
Quigley Co., Inc., New York, N. Y.
Ric-wil Co., Cleveland, O. (Underground)
Rock Fleece Co., El Paso, Tex.
Ruberoid Co., New York, N. Y. (Asbestos, magnesia, calsilite)
Sall Mountain Co., Chicago, Ill. (Asbestos and wool felt)
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Elizabeth, N. J. (Asbestos air cell, wool felt and hair felt)
Standard Asbestos Mfg. Co., Chicago, Ill.
Union Asbestos & Rubber Co., Cicero, Ill.
United Cork Companies, Lyndhurst, N. J.
Universal Zonolite Insulation Co., Chicago, Ill.
Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Walker Jamar Co., Duluth, Minn.
Western Mineral Products Co., Omaha, Nebr. (underground)
• Wilson, Inc., Grant, Chicago, Ill.
Wyckoff & Son Co., A., Elmira, N. Y. (Wood)

INSULATION, STEAM TRAP

• Grant Wilson, Inc., Chicago, Ill.
• Wilson, Inc., Grant, Chicago, Ill.

IONIZATION APPARATUS

Coroaire Heater Corp., The, Cleveland, O.
Electroaire Corp., Chicago, Ill.
Montgomery Bros., San Francisco, Calif.
Norwood Filtration Co., The, Florence, Mass.
United States Ozone Co. of America, Scottdale, Pa.

IRON BODY VALVES

See Valves, Gate; and Valves, Globe

JACKETED PIPE

See Pipe, Jacketed

JOINTS, PIPE, ELECTRICAL INSULATING

Barco Mfg. Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.

JOINTS, PIPE, EXPANSION, PACKLESS

• American District Steam Co., North Tonawanda, N. Y.
Badger Fire Extinguisher Co., Somerville, Mass.
• Badger & Sons Co., E. B., Boston, Mass. (Corrugated copper, stainless steel)
Barco Mfg. Co., Chicago, Ill.
Chiksan Tool Co., Brea, Calif.
• Crane Co., Chicago, Ill.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
• Fulton Sylphon Co., Knoxville, Tenn.
Harris & Co., Arthur, Chicago, Ill.
Kopperman & Sons, Joseph, Philadelphia, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
Northern Indiana Brass Co., Elkhart, Ind.
Semet-Solvay Engineering Corp., New York, N. Y.
United States Rubber Co., New York, N. Y.
Zallea Brothers & Johnson, Wilmington, Del.

JOINTS, PIPE, EXPANSION, SLIP

• American District Steam Co., North Tonawanda, N. Y.
Belfield Co., H., Philadelphia, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Clow & Sons, James B., Chicago, Ill.
• Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Howard Iron Works & Alberger Heater Co., Buffalo, N. Y.
• Illinois Engineering Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Northern Indiana Brass Co., Elkhart, Ind.
Powell Co., Wm., Cincinnati, O.
Semet-Solvay Engineering Corp., New York, N. Y.
• Walworth Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.
• Webster & Co., Warren, Camden, N. J.
• Yarnall-Waring Co., Philadelphia, Pa.

JOINTS, PIPE, FLEXIBLE SWING AND REVOLVING

Barco Mfg. Co., Chicago, Ill.
Bordo Co., Inc., L. J., Glenside, Pa.
• Crane Co., Chicago, Ill.
Flexo Supply Co., Inc., St. Louis, Mo.
Patterson-Ballagh Corp., Los Angeles, Calif.
Powell Co., Wm., Cincinnati, O.
• Spraying Systems Co., Chicago, Ill.
Water Cooling Corp., New York, N. Y.

JOINTS, UNIVERSAL, FOR OPERATING VALVES

Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blood Brothers Machine Co., Allegan, Mich.
Brooks Equipment Corp., New York, N. Y.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Newman Brothers, Inc., Cincinnati, O.
Piezo Mfg. Corp., New York, N. Y.
Stow Mfg. Co., Binghampton, N. Y. (flexible shafts)

KATA THERMOMETERS

See Thermometers, Kata

LACQUERS

See Enamels and Lacquers

LAMPS, STERILIZING, FOR DUCT INSTALLATION

General Electric Co., Lamp Dept., Nela Park, Cleveland, O.
Westinghouse Electric Corp., Bloomfield, N. J.

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LEAD PIPE
See Pipe and Tubing, Lead and Lead Alloy

LEAD SHEETS
See Sheets, Lead

LEAD TUBING
See Pipe and Tubing, Lead and Lead Alloy

LEAK DETECTORS
See Detectors, Leak, Refrigerant

LEATHER BELTING
See Belting, Flat, Leather

LEATHER PACKING
See Packing, Leather

LIGHTS, PILOT AND SIGNAL
Armstrong Heat Control Co., Portland, Ore.
Cooper Co., Clark, Palmyra, N. J.
Dial Light Co. of America, Inc., New York, N. Y.
• General Controls Co., Glendale, Calif.
General Electric Co., Lamp Dept., Nela Park, Cleveland, O.
Hart Mfg. Co., The, Hartford, Conn.
Signal Indicator Co., New York, N. Y.
Westinghouse Electric Corp., Cleveland, O.

LINKS, FUSIBLE
Century Fan & Ventilator Co., New York, N. Y.
• Grinnell Co., Inc., Providence, R. I.

LIQUID LEVEL GAGES
See Gages, Liquid Level

LIQUID LEVEL INDICATORS
See Indicators, Liquid Level

LIQUID LEVEL RECORDERS
See Recorders, Liquid Level

LIQUID PRESSURE REGULATORS
See Regulators, Pressure, Liquid

LOCK FORMING MACHINES
See Machines, Pittsburgh Lock Forming

LOCK NUTS
See Nuts, Lock

LOUVERS AND SHUTTERS, AUTOMATICALLY OR MANUALLY CONTROLLED
Air Conditioning Products Co., Detroit, Mich.
Air Control Products, Inc., Coopersville, Mich.
Air Controls, Inc., Cleveland, O.
Airecon Industries, Detroit, Mich.
Airmaster Corp., Chicago, Ill.
Allen Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
Ames Co., W. R., San Francisco, Calif.
Arex Co., Chicago, Ill.
• Barber-Colman Co., Rockford, Ill.
Belco Exhaust Fan Mfg. Co., St. Louis, Mo.
Biersach & Niedermeyer Co., Milwaukee, Wis.
• Bishop & Babcock Mfg. Co., Cleveland, O.
• Buffalo Forge Co., Buffalo, N. Y.
Burt Mfg. Co., Akron, O.
Campbell Heating Co., E. K., Kansas City, Mo.
Champion Blower & Forge Co., Lancaster, Pa.
• Chelsea Products, Inc., Irvington, N. J.
Chicago Metal Mfg. Co., Chicago, Ill.
Circulators & Devices Mfg. Corp., New York, N. Y.
Clay Equipment Corp., Cedar Falls, Ia.
• De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Decatur Iron & Steel Co., Decatur, Ala.
Dual Air Fan Co., Chicago, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Elgo Shutter & Mfg. Co., Detroit, Mich.
Gillian Mfg. Co., Detroit, Mich.
Guth Co., Edwin F., St. Louis, Mo.
Hirschman-Pohle Co., Inc., LeRoy, N. Y.
• Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
International Steel Co., Evansville, Ind.
Jamieson Mfg. Co., Dallas, Tex.
• Johnson Fan & Blower Corp., Chicago, Ill.
Johnson Co., William W., Dayton, O.
Jordan & Co., Paul R., Indianapolis, Ind.
Kelvin-White Co., Boston, Mass.
King Ventilating Co., Owatonna, Minn.
Klee Co., Geo. B., Cincinnati, O.
• Lau Blower Co., Dayton, O.
Leslie Welding Co., Chicago, Ill.
Lockjoint Wood Products Co., Wichita, Kans. (Wood; stationary door, wall, window and ceiling)
Martin Fan & Blower Co., Chicago, Ill.
Maysteel Products, Inc., Milwaukee, Wis.
Meier Electric & Machine Co., Indianapolis, Ind.
Meyer Mfg. Co., Detroit, Mich.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Myers Electric Co., Inc., Pittsburgh, Pa.
Nelson Corp., Herman, Moline, Ill.
Peerless Electric Co., Warren, O.
Reed Unit-Fans, Inc., New Orleans, La.
Richmond Fireproof Door Co., Richmond, Ind.
Riggin Metal Products, Inc., Kankakee, Ill.
Robertson Co., H. H., Pittsburgh, Pa.
Schoedinger, F. O., Columbus, O.
Signal Electric Mfg. Co., Menominee, Mich.
Sioux Steel Co., Sioux Falls, S. D.
Southbridge Roofing Co., Inc., Southbridge, Mass.
• Standard Stamping & Perforating Co., Chicago, Ill.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
• Tuttle & Bailey, Inc., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
Utility Appliance Corp., Los Angeles, Calif.
Van Noorden Co., E., Boston, Mass.
Victor Electric Products, Inc., Cincinnati, O.
• Waterloo Register Div. of Associated Manufacturers, Inc., Waterloo, Ia.

LOW WATER CUT-OFFS
See Cut-Offs, Low Water, Heating Boiler

MACHINES, BALANCING
See Equipment, Balancing

MACHINES, BLUE PRINT AND WHITE PRINT
For Reproducing Engineering Drawings

• American Photocopy Equipment Co., Chicago, Ill.
Bruning Co., Inc., Charles, Long Island City, N. Y.
Ozalid Products Div., General Aniline & Film Corp., Johnson City, N. Y.
Paragon-Revolute Corp., Rochester, N. Y.
Pease Co., C. F., The, Chicago, Ill.
Peck & Harvey, Chicago, Ill.
Wickes Brothers, Saginaw, Mich.

MACHINES AND FILM, X-RAY
Eastman Kodak Co., Rochester, N. Y.
Kelly-Koet, Covington, Ky.
North American Philips Co., Inc., New York, N. Y.
Westinghouse Electric Corp., X-Ray Div., Baltimore, Md.

MACHINES, PIPE CUTTING AND THREADING, PORTABLE
• Air Reduction Sales Co., New York, N. Y. (Cutting and beveling)
Beaver Pipe Tools, Inc., Warren, O.
Curtis & Curtis Co., The, Bridgeport, Conn.
Landis Machine Co., Inc., Waynesboro, Pa.
Linde Air Products Co., The, New York, N. Y. (Cutting and beveling)
National Machine Works, Chicago, Ill.
Nye Tool & Machine Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
• Ridge Tool Co., Elyria, O. (Hand)
Toledo Pipe Threading Machine Co., Toledo, O.

MACHINES, PIPE CUTTING AND THREADING, STATIONARY
Bignall & Keeler Machine Wks., Edwardsville, Ill.
Curtis & Curtis Co., The, Bridgeport, Conn.
Jarecki Mfg. Co., Erie, Pa.
Landis Machine Co., Inc., Waynesboro, Pa.
Oster Mfg. Co., Cleveland, O.
Pines Engineering Co., Inc., Aurora, Ill.
Saunders Machine & Tool Corp., Yonkers, N. Y.
Toledo Pipe Threading Machine Co., Toledo, O.
Wallace Supplies Mfg. Co., Chicago, Ill.

MACHINES, PITTSBURGH LOCK FORMING
Dahlstrom Machine Works, Chicago, Ill.
Lockformer Co., Chicago, Ill.
Maplewood Machinery Co., Inc., Chicago, Ill.
Rafter Machine Co., Belleville, N. J.
Whitney Metal Tool Co., Rockford, N. J.

MACHINES, REFRIGERATION, ABSORPTION
Vogt Machine Co., Henry, Louisville, Ky.
Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
• Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

MACHINES, TESTING, WELD
• Air Reduction Sales Co., New York, N. Y.

MACHINES, VERTICAL, THREADING AND BORING
Bullard Co., The, Bridgeport, Conn.

MAGNESIUM ALLOY SHEETS
See Sheets, Magnesium Alloy

MAGNESIUM PIPE
See Pipe, Magnesium

MAGNESIUM TUBING
See Tubing, Magnesium

MALLEABLE UNIONS
See Unions, Malleable

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MANIFOLDS, REFRIGERATION

Frick Co., Waynesboro, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
• Mueller Brass Co., Port Huron, Mich.
Superior Valve and Fittings Co., Pittsburgh, Pa.
• Swan Engineering Co., Inc., Bloomfield, N. J.
U. S. Pipe & Mfg. Co., San Francisco, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
Weatherhead Co., Cleveland, O.
York Corp., York, Pa.

MANOMETERS

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Barton Instrument Co., Los Angeles, Calif.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
Builders-Providence Co., Div. of Builders Iron Foundry, Providence, R. I.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
• Hays Corp., Michigan City, Ind.
Hill, E. Vernon, Chicago, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Meriam Instrument Co., The, Cleveland, O.
Precision Scientific Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Wallace & Tiernan Co., Inc., Newark, N. J.

MECHANICAL DRIVE TURBINES

See Turbines, Mechanical Drive

MECHANICAL SPEED CHANGERS

See Changers, Speed, Mechanical

MECHANICAL TRAPS

See Traps, Steam, Mechanical

MERCURY SWITCHES

See Switches, Mercury

METAL HOSE

See Hose, Metal and Fittings

METAL, POROUS, FOR FILTRATION, SEPARATION, DIFFUSION AND FLOW CONTROL

General Motors Corp., Moraine Products Div., Dayton, O.
Keystone Carbon Co., Inc., St. Marys, Pa.

METALLIC BELLOWS

See Bellows, Thermostatic and Metallic

METALLIC PACKING

See Packing, Metallic

METERS, AIR VELOCITY, DIRECT READING

Detroit Air Conditioning Service Co., Inc., Detroit, Mich.
• Hays Corp., Michigan City, Ind.
• Illinois Testing Laboratories, Inc., Chicago, Ill.
• Taylor Instrument Companies, Rochester, N. Y.

METERS, CONDENSATION

• American District Steam Co., North Tonawanda, N. Y.
Buffalo Meter Co., Buffalo, N. Y.
Central Station Steam Co., Detroit, Mich.
Cochrane Corp., Philadelphia, Pa.
Neptune Meter Co., New York, N. Y.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Worthington-Gamon Meter Co., Harrison, N. J.

METERS, FLOW, REFRIGERANT

Bristol Co., Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Moore Products Co., Philadelphia, Pa.
Neptune Meter Co., New York, N. Y.

METERS, FLOW, STEAM

• American District Steam Co., North Tonawanda, N. Y.
American Meter Co., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Cochrane Corp., Philadelphia, Pa.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
• Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
• Leeds & Northrup Co., Philadelphia, Pa.
Mason-Neilan Regulator Co., Boston, Mass.
Meriam Instrument Co., The, Cleveland, O.
Republic Flow Meters Co., Chicago, Ill.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.

METERS, PROCESS LIQUID

American Meter Co., Inc., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Bowser, Inc., Fort Wayne, Ind.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Buffalo Meter Co., Buffalo, N. Y.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Cochrane Corp., Philadelphia, Pa.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
• Hays Corp., Michigan City, Ind.
Mason-Neilan Regulator Co., Boston, Mass.
Meriam Instrument Co., The, Cleveland, O.
Moore Products Co., Philadelphia, Pa.
Neptune Meter Co., New York, N. Y.
Pittsburgh Equitable Meter Co., Pittsburgh, Pa.
Republic Flow Meters Co., Chicago, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.
Schutte & Koerting Co., Philadelphia, Pa.
• Taylor Instrument Companies, Rochester, N. Y.
Worthington-Gamon Meter Co., Harrison, N. J.

METERS, VOLUME, AIR AND GAS

American Meter Co., Inc., New York, N. Y.
Bristol Co., The, Waterbury, Conn.
Fischer & Porter Co., Hatboro, Pa.
• Hays Corp., Michigan City, Ind.
Meriam Instrument Co., The, Cleveland, O.
Pittsburgh Equitable Meter Co., Pittsburgh, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.
Selas Corp. of America, Philadelphia, Pa.

METERS, WATER

Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Buffalo Meter Co., Buffalo, N. Y.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Hersey Mfg. Co., South Boston, Mass.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
National Meter Co., Brooklyn, N. Y.
Neptune Meter Co., New York, N. Y.
Pfening Co., Fred D., Columbus, O. (batch measuring)
Pittsburgh Equitable Meter Co., Pittsburgh, Pa.
Republic Flow Meters Co., Chicago, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.
Union Water Meter Co., Worcester, Mass.
Worthington-Gamon Meter Co., Harrison, N. J.

MIXING VALVES

See Valves, Mixing, Steam and Water

MODULATING VALVES

See Valves, Radiator, Steam and Hot Water

MOTOR BASES

See Bases and Pads, Vibration Isolating; Bases, Motor Tension Adjusting

MOTOR CONTROLLERS

See Controllers and Starters, Motor

MOTOR OPERATED VALVES

See Valves, Motor Operated

MOTOR STARTERS

See Controllers and Starters, Motor

MOTORS, ELECTRIC, FRACTIONAL HP

• Alliance Mfg. Co., Alliance, O. (Shaded pole)
Ampex Electric Mfg. Co., San Carlos, Calif.
• Baldor Electric Co., St. Louis, Mo.
• Barber-Colman Co., Rockford, Ill.
Bodine Electric Co., Chicago, Ill.
Brown-Brockmeyer Co., Dayton, O.
Canatsey Electric Mfg. Co., Kansas City, Mo.
Century Electric Co., St. Louis, Mo.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Delco Products Div., General Motors Corp., Dayton, O.
Diehl Mfg. Co., Somerville, N. J.
• Dynamic Air Engineering, Inc., Los Angeles, Calif.
Eastern Air Devices, Inc., Brooklyn, N. Y.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fairbanks, Morse & Co., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
• Hansen Mfg. Co., Inc., Princeton, Ind.
Holtzer-Cabot, Div. First Industrial Corp., Boston, Mass.
Howell Electric Motors Co., Howell, Mich.
• Janette Mfg. Co., Chicago, Ill.
Leland Electric Co., Dayton, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Master Electric Co., Dayton, O.
Ohio Electric Mfg. Co., Cleveland, O.

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Peerless Electric Co., Warren, O.
Redmond Co., Inc., Owosso, Mich.
Reynolds Electric Co., Chicago, Ill.
Robbins & Myers, Inc., Springfield, O.
Russell Electric Co., Chicago, Ill.
Signal Electric Mfg. Co., Menominee, Mich.
Small Motors, Inc., Chicago, Ill.
Smith Mfg. Co., Inc., F. A., Rochester, N. Y.
Speedway Mfg. Co., Chicago (Cicero), Ill.
Star Electric Motor Co., Bloomfield, N. J.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Victor Electric Products, Inc., Cincinnati, O.
• Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric Corp., East Pittsburgh, Pa.

MOTORS, ELECTRIC, 1 HP AND OVER

Allis Co., Louis, The, Milwaukee, Wis.
• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
• Baldor Electric Co., St. Louis, Mo.
Bogue Electric Co., Paterson, N. J.
Brown-Brockmeyer Co., Dayton, O.
Burke Electric Co., Erie, Pa.
Byron Jackson Co., Los Angeles, Calif. (Submersible)
Century Electric Co., St. Louis, Mo.
Continental Electric Co., Inc., Newark, N. J.
Crocker-Wheeler Elec. Mfg. Co., Div., Joshua Hendy Iron Works, Ampere, N. J.
Delco Products Div., General Motors Corp., Dayton, O.
Diehl Mfg. Co., Somerville, N. J.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fairbanks, Morse & Co., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Howell Electric Motors Co., Howell, Mich.
Ideal Electric & Mfg. Co., Mansfield, O.
Imperial Electric Co., Akron, O.
Jackson Co., Byron, Los Angeles, Calif. (Submersible)
• Janette Mfg. Co., Chicago, Ill.
Leland Electric Co., Dayton, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Marble-Card Electric Co., Gladstone, Mich.
Master Electric Co., Dayton, O.
Peerless Electric Co., Warren, O.
Philadelphia Gear Works, Inc., Philadelphia, Pa. (Geared)
Reliance Electric & Engineering Co., Cleveland, O.
Robbins & Myers, Inc., Springfield, O.
Star Electric Motor Co., Bloomfield, N. J.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electric Motors, Inc., Los Angeles, Calif.
• Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric Corp., East Pittsburgh, Pa.

MUSHROOM VENTILATORS

See Ventilators, Mushroom

NEEDLE BEARINGS

See Bearings, Needle

NEEDLE VALVES

See Valves, Needle

NEUTRALIZERS, ACID

See Dehydrant and Acid Neutralizer

NEUTRALIZERS, ODOR

See Adsorbers, Odor

NICKEL AND NICKEL ALLOY PIPE AND FITTINGS

See Tubing, Nickel and Alloy; Fittings, Pipe, Nickel and Nickel Alloy; Pipe, Nickel and Nickel Alloy

NICKEL AND NICKEL ALLOY SHEETS

See Sheets, Nickel and Nickel Alloy

NIPPLES, PIPE, BRASS AND COPPER

Acheson Mfg. Co., Rankin, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Nipple Mfg. Co., Chicago, Ill.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
• Crane Co., Chicago, Ill.
Downs-Smith Brass & Copper Co., New York, N. Y.
Ellsworth Pipe & Supply Co., Milwaukee, Wis.
Grabler Mfg. Co., Cleveland, O.
• Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
• Mueller Brass Co., Port Huron, Mich.
Parker Appliance Co., The, Cleveland, O.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Sales & Co., Murray W., Detroit, Mich.
• Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Weatherhead Co., Cleveland, O.

NIPPLES, PIPE, NICKEL AND NICKEL ALLOY

International Nickel Co., Inc., The, New York, N. Y.

NIPPLES, PIPE, IRON AND STEEL

Alabama Pipe Co., Anniston, Ala. (Cast iron)
Alloy Steel Products Co., Linden, N. J. (Stainless steel)
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Chicago Nipple Mfg. Co., Chicago, Ill.
Clow & Sons, James B., Chicago, Ill.
Colonial Alloys Co., Metals Div., Philadelphia, Pa. (Stainless)
• Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa. (Swage)
Ellsworth Pipe & Supply Co., Milwaukee, Wis.
Flori Pipe Co., The, St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
• Grinnell Co., Inc., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
Illinois Malleable Iron Co., Chicago, Ill.
International Nickel Co., Inc., The, New York, N. Y. (nickel and nickel alloy)
Larkin Packer Co., St. Louis, Mo.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Plumb Mfg. Co., Utica, N. Y.
Sales & Co., Murray W., Detroit, Mich.
• Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
• Youngstown Sheet & Tube Co., Youngstown, O.

NIPPLES, RADIATOR, SLIP

Plumb Mfg. Co., Utica, N. Y.

NOISE ELIMINATORS

See Bases and Pads, Vibration Isolating; Hose, Metal and Fittings; Insulation, Sound Deadening

NOZZLES, ATOMIZING

• Martocello & Co., Jos. A., Philadelphia, Pa.
Ross Sprinkler Co., Pasadena, Calif.
Supreme Electric Products Corp., Rochester, N. Y.

NOZZLES, SPRAY

American Cooling Tower Co., Kansas City, Mo.
American Molded Products Co., Chicago, Ill.
April Showers Co., Washington, D. C.
Bahnson Co., Winston-Salem, N. C.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Bayley Blower Co., Milwaukee, Wis.
Benjamin Air Rifle Co., St. Louis, Mo.
• Binks Mfg. Co., Chicago, Ill.
Black Mfg. Co., The, Baltimore, Md.
Blower Application Co., Milwaukee, Wis.
• Buffalo Forge Co., Buffalo, N. Y.
Chain Belt Co., Milwaukee, Wis.
• Clarage Fan Co., Kalamazoo, Mich.
DeVilbiss Co., The, Toledo, O.
Dustlix Corp., Milwaukee, Wis.
Eclipse Air Brush Co., Inc., Newark, N. J.
Electric Sprayit Co., The, Sheboygan, Wis.
Fluor Corp., Ltd., The, Los Angeles, Calif.
International Moistening Co., Providence, R. I.
Link-Belt Co., Chicago, Ill.
Marley Co., Inc., The, Kansas City, Kans.
• Martocello & Co., Jos. A., Philadelphia, Pa.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
National Engineering & Mfg. Co., Kansas City, Mo.
Parks-Cramer Co., Fitchburg, Mass.
Phillips Cooling Tower Co., Inc., New York, N. Y.
Plummer Spray Equipment Co., Napoleon, O.
• Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Rega Mfg. Co., Rochester, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Ross Sprinkler Co., Pasadena, Calif.
Schutte & Koerting Co., Philadelphia, Pa.
Skinner Irrigation Co., Troy, O.
Spray Engineering Co., Somerville, Mass.
• Spraying Systems Co., Chicago, Ill.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
Supreme Electric Products Corp., Rochester, N. Y.
Thermal Industries, Indio, Calif.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Corp., St. Louis, Mo.
• Yarnall-Waring Co., Philadelphia, Pa.

NUTS, LOCK

Buffalo Bolt Co., North Tonawanda, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
• Crane Co., Chicago, Ill.
Dzus Fastener Co., Inc., Babylon, N. Y.
Elastic Stop Nut Corp. of America, Union, N. J.
• Grinnell Co., Inc., Providence, R. I.
Industrial Screw Co., Chicago, Ill.
Kwikon Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
Locknut Corp. of America, Chicago, Ill.
MacLean-Fogg Lock Nut Co., Chicago, Ill.
Malleable Iron Fittings Co., Branford, Conn.
Palnut Co., Irvington, N. J.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
SKF Industries, Inc., Philadelphia, Pa.
Standard Pressed Steel Co., Jenkintown, Pa.
• Tinnerman Products, Inc., Cleveland, O.
• Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

OBSERVATION BOILER PORTS

See Ports, Observation, Boiler

ODOR ADSORBERS

See Filters, Air; Adsorbers, Odor

• Advertisement in this issue. See Index to Advertisers, pages 367-368.

ODOR NEUTRALIZERS

See Adsorbers, Odor; Compounds, Air Freshening

OIL BURNERS

See Burners, Oil

OIL COOLERS

See Coolers, Oil

OIL FIRED UNIT HEATERS

See Heaters, Unit, Oil Fired

OIL SEPARATORS

See Separators, Steam and Oil

OPEN END WRENCHES

See Wrenches, Open End

OPERATORS, DAMPER, DUCT

Arens Controls, Inc., Chicago, Ill.
• Autempco Corp., New York, N. Y.
• Automatic Products Co., Milwaukee, Wis.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
• Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
• Cook Electric Co., Chicago, Ill.
• Fulton Sylphon Co., Knoxville, Tenn.
• General Controls Co., Glendale, Calif.
Hotstream Heater Co., Cleveland, O.
• Johnson Service Co., Milwaukee, Wis.
Mason-Neilan Regulator Co., Boston, Mass.
• Mercoid Corp., The, Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Perfex Corp., Milwaukee, Wis.
• Powers Regulator Co., Chicago, Ill.
Sampsel Time Control, Inc., Spring Valley, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Young Regulator Co., Cleveland, O.

OPERATORS, VALVE

• Autempco Corp., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
• Barber-Colman Co., Rockford, Ill.
Bristol Co., Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
• Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Foxboro Co., Foxboro, Mass.
• Fulton Sylphon Co., Knoxville, Tenn.
• General Controls Co., Glendale, Calif.
Grove Regulator Co., Oakland, Calif.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
• Johnson Service Co., Milwaukee, Wis.
Mason-Neilan Regulator Co., Boston, Mass.
• McDonnell & Miller, Inc., Chicago, Ill.
• McIntyre Co., The, Newton, Mass.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Perfex Corp., Milwaukee, Wis.
• Powers Regulator Co., Chicago, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.

ORIFICE FLANGES

See Flanges, Orifice

ORIFICE UNIONS

See Unions, Orifice

ORIFICES, RADIATOR

Armstrong Heat Control Co., Portland, Ore.
• Autempco Corp., New York, N. Y.
Barnes & Jones, Inc., Jamaica Plain, Boston, Mass.
• Dunham Co., C. A., Chicago, Ill.
• Haines & Co., William S., Philadelphia, Pa.
• Illinois Engineering Co., Chicago, Ill.
• Johnson Service Co., Milwaukee, Wis.
New York Air Valve Corp., New York, N. Y.
• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
• Sterling, Inc., Milwaukee, Wis.
Tallmadge & Co., Webster, East Orange, N. J.
• Thrush & Co., H. A., Peru, Ind.
Webster Tallmadge & Co., East Orange, N. J.

OXY-ACETYLENE WELDING

See Welding and Cutting Apparatus, Oxy-Acetylene

OZONE APPARATUS

A & J Co., Chicago, Ill.
Automatic Pump & Softener Corp., Rockford, Ill.
• Chelsea Products, Inc., Irvington, N. J.
Coroaire Heater Corp., The, Cleveland, O.
Electroaire Corp., Chicago, Ill.
Montgomery Bros., San Francisco, Calif.
Norwood Filtration Co., The, Florence, Mass.
Ozone Air Co., Grand Rapids, Mich.
Ozone Processes, Inc., Philadelphia, Pa.
Sealkote Corp., Chicago, Ill.
United States Ozone Co. of America, Scottdale, Pa.

PACKAGED STEAM GENERATORS

See Boilers, Steam Generating Units, Heating and Process

PACKING, ASBESTOS

Acme Asbestos Coverings & Flooring Co., Chicago, Ill.
Allpax Co., Inc., Mamaroneck, N. Y.
Anchor Packing Co., Philadelphia, Pa.
Austin-Mason Co., New York, N. Y.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Chicago Specialty Mfg. Co., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Durabla Mfg. Co., New York, N. Y.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felt Products Mfg. Co., Chicago, Ill.
Garlock Packing Co., Palmyra, N. Y.
Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.
Goodyear Tire & Rubber Co., Akron, O.
• Grant Wilson, Inc., Chicago, Ill.
Greene, Tweed & Co., New York, N. Y.
• Jenkins Bros., New York, N. Y.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Klingerit, Inc., New York, N. Y. (Sheet and rod)
Linear Incorporated, Philadelphia, Pa.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., Passaic, N. J.
Metallo Gasket Co., New Brunswick, N. J.
Mitchell & Smith, Inc., Detroit, Mich.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Plant Rubber & Asbestos Works, San Francisco, Calif.
Quaker Rubber Corp., Philadelphia, Pa.
Sall Mountain Co., Chicago, Ill.
Thermoid Rubber, Div. of Thermoid Co., Trenton, N. J.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Rubber Co., New York, N. Y.
• Wilson, Inc., Grant, Chicago, Ill.

PACKING, FIBER

Anchor Packing Co., Philadelphia, Pa.
Austin-Mason Co., New York, N. Y.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Darcoid Co., Inc., New York, N. Y.
Durabla Mfg. Co., New York, N. Y.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Endura Mfg. Corp., Quakertown, Pa.
Garlock Packing Co., Palmyra, N. Y.
Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.
• Jenkins Bros., New York, N. Y.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Linear Incorporated, Philadelphia, Pa.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Metallo Gasket Co., New Brunswick, N. J.
Mitchell & Smith, Inc., Detroit, Mich.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Plant Rubber & Asbestos Works, San Francisco, Calif.
• Products Research Co., Los Angeles, Calif.
Quaker Rubber Corp., Philadelphia, Pa.
Thermoid Rubber, Div. of Thermoid Co., Trenton, N. J.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Rubber Co., New York, N. Y.

PACKING, LEATHER

Alexander Bros., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Chicago Belting Co., Chicago, Ill.
Davies & Co., Wayne, Worcester, Mass.
Excelsior Leather Washer Mfg. Co., Rockford, Ill.
Graton & Knight Co., Worcester, Mass.
Houghton & Co., E. F., Philadelphia, Pa.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Plant Rubber & Asbestos Works, San Francisco, Calif.
• Rhoads & Sons, J. E., Philadelphia, Pa.
Schieren Co., Chas. A., New York, N. Y.
• Watson-Stillman Co., Roselle, N. J.
Wayne Davies & Co., Worcester, Mass.
Williams & Son, I. B., Dover, N. H.

PACKING, METALLIC

Allpax Co., Inc., Mamaroneck, N. Y.
Anchor Packing Co., Philadelphia, Pa.
Austin-Mason Co., New York, N. Y.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Conneaut Plastic Metallic Packing Co., Conneaut, O.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Felt Products Mfg. Co., Chicago, Ill.
France Packing Co., Tacony, Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.
Hound Packing Co., Chicago, Ill.
Johns-Manville, New York, N. Y.
Klingerit, Inc., New York, N. Y. (Sheet & rod)
Linear Incorporated, Philadelphia, Pa.

McQuay-Norris Mfg. Co., St. Louis, Mo.
National Engineering Products, Inc., Washington, D. C.
National Lead Co., New York, N. Y.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Plant Rubber & Asbestos Works, San Francisco, Calif.
Quaker Rubber Corp., Philadelphia, Pa.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Rubber Co., New York, N. Y.

PACKING, RUBBER AND SYNTHETIC

Anchor Packing Co., Philadelphia, Pa.
Austin-Mason Co., New York, N. Y.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Boston Woven Hose & Rubber Co., Boston, Mass.
Chicago Belting Co., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Continental Rubber Wks., Erie, Pa.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Garlock Packing Co., Palmyra, N. Y.
Gates Rubber Co., Denver, Colo.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Graton & Knight Co., Worcester, Mass.
Hamilton Rubber Mfg. Co., Trenton, N. J.
Houghton & Co., E. F., Philadelphia, Pa.
• Jenkins Bros., New York, N. Y.
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Linear Incorporated, Philadelphia, Pa.
Manhattan Rubber Mfg. Co., Div. of Raybestos-Manhattan Inc., Passaic, N. J.
Mitchell & Smith, Inc., Detroit, Mich.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Plant Rubber & Asbestos Works, San Francisco, Calif.
• Products Research Co., Los Angeles, Calif.
Quaker Rubber Corp., Philadelphia, Pa.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O
Thermoid Rubber, Div. of Thermoid Co., Trenton, N. J.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.

PANELS, PERFORATED, FOR AIR DIFFUSION

• Pyle-National Co., The, Chicago, Ill.

PARTS FOR HEATING AND AIR CONDITIONING EQUIPMENT

Ackermann Mfg. Co., Wheeling, W. Va.
American Welding & Mfg. Co., Warren, O.
Carey Mfg. Co., Philip, Cincinnati, O. (Insulating panel for housing and duct construction)
• Commercial Shearing & Stamping Co., Youngstown, O. (Tank heads and bottoms, water heater legs, furnace stampings, etc.)
• Detroit Stamping Co., Detroit, Mich.
Geuder, Paeschke & Frey Co., Milwaukee, Wis.
Hartwell Engineering Co., Los Angeles, Calif. (Numerous production parts, door latches, etc.)
Lindsay Corp., The, Chicago, Ill. (Cabinet construction for air conditioning and warm air heating equipment)
• Mueller Brass Co., Port Huron, Mich. (Specially fabricated copper tubing, machine formed tubes)
Rigid-Tex Corp., Buffalo, N. Y.

PILLOW BLOCK BEARINGS

See Bearings, Pillow Block

PILOT LIGHTS

See Lights, Pilot and Signal

PIPE, ALUMINUM

• Revere Copper & Brass, Inc., New York, N. Y.

PIPE, ASBESTOS FIBER AND CEMENT

Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Stoneware Co., New York, N. Y.

PIPE BENDERS

See Benders, Pipe

PIPE, BRASS AND COPPER

• American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Downs-Smith Brass & Copper Co., New York, N. Y.
Hussey & Co., C. G., Pittsburgh, Pa.
• Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
• Mueller Brass Co., Port Huron, Mich.
• Phelps Dodge Copper Products Corp., British American Tube Div., New York, N. Y.
Pipe and Tube Products, Inc., New York, N. Y.
• Revere Copper and Brass, Incorporated, New York, N. Y.
Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.

PIPE, CAST IRON, PRESSURE, BELL AND SPIGOT

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Central Foundry Co., New York, N. Y.
Clow & Sons, James B., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Lynchburg Foundry Co., Lynchburg, Va.
McWane Cast Iron Pipe Co., Birmingham, Ala.
U. S. Pipe & Fdry. Co., Burlington, N. J.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE, CAST IRON, PRESSURE, FLANGED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Central Foundry Co., New York, N. Y.
Clow & Sons, James B., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Lynchburg Foundry Co., Lynchburg, Va.
McWane Cast Iron Pipe Co., Birmingham, Ala.
Straight Line Foundry & Machine Corp., Direct Separator Div., The, Syracuse, N. Y.
U. S. Pipe & Fdry. Co., Burlington, N. J.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE, CAST IRON, THREADED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, James B., Chicago, Ill.
McWane Cast Iron Pipe Co., Birmingham, Ala.
Somerville Iron Wks., Somerville, N. J.
U. S. Pipe & Fdry. Co., Burlington, N. J.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE CLEANING COMPOUNDS

See Compounds, Cleaning, Pipe Coil and Condenser

PIPE COILS

See Coils, Pipe

PIPE COUPLINGS

See Couplings, Pipe

PIPE CUTTERS

See Cutters

PIPE CUTTING MACHINES

See Machines, Pipe Cutting and Threading

PIPE EXTRACTORS

See Extractors, Pipe

PIPE, FIBER

Fibre Conduit Co., Orangeburg, N. Y.

PIPE FITTINGS

See Fittings, Pipe

PIPE FLANGES

See Flanges, Pipe

PIPE, GLASS

Corning Glass Wks., Corning, N. Y.
Fischer & Porter Co., Hatboro, Pa.

PIPE HANGERS

See Hangers and Supports, Pipe

PIPE, HARD RUBBER

American Hard Rubber Co., New York, N. Y.
Goodrich Co., B. F., Akron, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., Passaic, N. J.
Stokes Rubber Co., Jos., Trenton, N. J.
United States Rubber Co., New York, N. Y.

PIPE INSULATION

See Insulation, Pipe

PIPE, JACKETED

Devine Mfg. Co., Inc., J. P., Mt. Vernon, Ill.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Parks-Cramer Co., Fitchburg, Mass.
Roessing Mfg. Co., Pittsburgh, Pa.

PIPE JOINT COMPOUNDS

See Cement and Compounds, Pipe Joint

PIPE, LINED

• American Brass Co., Waterbury, Conn. (Tin)
American Cast Iron Pipe Co., Birmingham, Ala. (Cement)
American Hard Rubber Co., New York, N. Y. (Rubber)
• American Rolling Mill Co., The, Middletown, O.
American Smelting & Refining Co., New York, N. Y.
Cement Lined Pipe Co., Lynn, Mass.
Clow & Sons, James B., Chicago, Ill.
Cohoes Rolling Mill Co., Cohoes, N. Y. (Cement)
General Plate Div., Metals & Controls Corp., Attleboro, Mass (Silver lined)
Goodrich Co., B. F., Akron, O. (Rubber-lined)
Jones & Laughlin Steel Corp., Pittsburgh, Pa. (Cement)
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin lined)
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Manhattan Rubber Mfg. Co. Div. of Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)

• Advertisement in this issue. See Index to Advertisers, pages 367-368.

Michigan Pipe Co., Bay City, Mich. (Wood)
National Lead Co., New York, N. Y. (Lead)
Resisto Pipe & Valve Co., East Cambridge, Mass. (Lead)
United States Rubber Co., New York, N. Y. (Rubber)
United States Stoneware Co., New York, N. Y.
Vesco Corp., New York, N. Y. (Enamel)
Warren Foundry & Pipe Corp., New York, N. Y. (Cement-bituminous enamel)
• Youngstown Sheet & Tube Co., Youngstown, O.

PIPE LINE STRAINERS

See Strainers, Pipe Line

PIPE, MAGNESIUM

• Revere Copper and Brass, Inc., New York, N. Y.

PIPE, NICKEL AND NICKEL ALLOY

General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Globe Steel Tubes Co., Milwaukee, Wis.
International Nickel Co., New York, N. Y.
• Revere Copper and Brass, Incorporated, New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE NIPPLES

See Nipples, Pipe

PIPE, PLASTIC

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill.
American Hard Rubber Co., New York, N. Y.
Carter Products Corp., Cleveland, O.
Commercial Plastics Co., Chicago, Ill.
Commonwealth Products Co., Philadelphia, Pa.
Continental Diamond Fibre Co., Newark, Del.
Durante Insulated Pipe Line Co., Palo Alto, Calif.
Extruded Plastics, Inc., Norwalk, Conn.
Hodgman Rubber Co., Framingham, Mass.
Mills Corp., Elmer E., Chicago, Ill.
North Penn Co., New York, N. Y.
Skuttle Mfg. Co., Detroit, Mich.
United States Stoneware Co., New York, N. Y.
Yardley Plastics Co., Columbus, O.

PIPE, PRE-INSULATED

Baldwin-Hill Co., Trenton, N. J.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Ric-wil Co., Cleveland, O.

PIPE REAMERS

See Reamers, Pipe

PIPE REPAIR CLAMPS

See Clamps, Pipe Repair

PIPE, SPIRAL, RIVETED AND WELDED

• American Rolling Mill Co., The, Middletown, O.
Columbian Steel Tank Co., Kansas City, Mo.
• Naylor Pipe Co., Chicago, Ill.
• Revere Copper and Brass, Incorporated, New York, N. Y.
• Taylor Forge & Pipe Wks., Chicago, Ill.

PIPE, STEEL, BUTT AND LAP WELDED

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
• American Rolling Mill Co., The, Middletown, O.
• Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Tank Corp., Dunellen, N. J.
Byers Co., A. M., Pittsburgh, Pa.
Chicago Metal Mfg. Co., Chicago, Ill.
Cohoes Rolling Mill Co., Cohoes, N. Y.
Fretz-Moon Tube Co., Butler, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Pittsburgh Tube Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.
• Revere Copper and Brass, Incorporated, New York, N. Y.
Semet-Solvay Engineering Corp., New York, N. Y. (Specially fabricated)
South Chester Tube Co., Chester, Pa.
• Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Tippett & Wood, Phillipsburg, N. J. (12 in. and larger)
• Wheatland Tube Co., Philadelphia, Pa.
Wheeling Steel Corp., Wheeling, W. Va.
• Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, SEAMLESS

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Pipe and Tube Products, Inc., New York, N. Y.
Pittsburgh Steel Co., Pittsburgh, Pa.
• Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Timken Roller Bearing Co., Steel & Tube Div., Canton, O.
• Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, STAINLESS

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Alloy Steel Products Co., Linden, N. J.
American Locomotive Co., Alco Products Div., New York, N. Y.
• American Rolling Mill Co., The, Middletown, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Globe Steel Tubes Co., Milwaukee, Wis.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.
Timken Roller Bearing Co., Steel & Tube Div., Canton, O.

PIPE, STONEWARE

General Ceramics Co., Keasbey, N. J.
Knight, Maurice A., Akron, O. (Stoneware)
United States Stoneware Co., New York, N. Y. (Stoneware)

PIPE SUPPORTS

See Hangers and Supports, Pipe

PIPE TONGS

See Tongs, Pipe

PIPE, TUBING, FITTINGS AND VALVES, CARBON AND GRAPHITE

National Carbon Co., New York, N. Y.

PIPE AND TUBING, LEAD AND LEAD ALLOY

Alpha Metals, Inc., Brooklyn, N. Y.
American Smelting & Refining Co., New York, N. Y.
Eagle-Picher Co., Cincinnati, O.
Flemm Lead Co., Inc., Long Island City, N. Y.
Gardiner Metal Co., Chicago, Ill.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Rochester Lead Works, Inc., Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
United States Stoneware Co., New York, N. Y.

PIPE VISES

See Vises, Pipe

PIPE, WOOD

• American District Steam Co., North Tonawanda, N. Y.
Caldwell Co., W. E., Louisville, Ky.
Michigan Pipe Co., Bay City, Mich.
Wyckoff & Son Co., A., Elmira, N. Y.

PIPE WRENCHES

See Wrenches, Pipe

PIPE, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.

PISTON RINGS

See Rings, Piston

PITOT TUBES

See Tubes, Pitot

PITTSBURGH LOCK FORMING MACHINES

See Machines, Pittsburgh Lock Forming

PLASTIC PIPE AND PIPE FITTINGS

See Pipe, Plastic; Fittings, Pipe, Plastic

PLASTIC TUBING

See Tubing, Plastic

PLATES, FLOOR AND CEILING

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
• American Rolling Mill Co., The, Middletown, O.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Nipple Mfg. Co., Chicago, Ill.
Farley Sleeve & Hanger Co., Cleveland, O.
Fee & Mason Mfg. Co., Inc., New York, N. Y.
Globe Machine & Stamping Co., Div. of Hupp Motor Car Corp., Cleveland, O.
Grabler Mfg. Co., Cleveland, O.
• Grinnell Co., Inc., Providence, R. I.
Jarecki Mfg. Co., Erie, Pa.
Keeney Mfg. Co., Newington, Conn.
Little Mfg. Co., M. S., Hartford, Conn.
Newman Brothers, Inc., Cincinnati, O.
Ravena Iron Co., Ravena, N. Y.
Russell Mfg. Co., John M., Naugatuck, Conn.
• Walworth Co., New York, N. Y.

PLUG COCKS

See Valves, Plug

PLUG VALVES

See Valves, Plug

PLUGS, FUSIBLE, BOILER

American Injector Co., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Walworth Co., New York, N. Y.

PLUGS, REPAIR, FOR TANKS

Rolyan Metal Products, Chicago, Ill.

POROUS METAL

See Metal, Porous

PORTS, OBSERVATION, BOILER

Chicago Fire Brick Co., Chicago, Ill.
Detroit Stoker Co., Detroit, Mich.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Sims Co., Erie, Pa.

POSITIONERS, WELDING

See Welding and Cutting Apparatus, Oxy-Acetylene

POWER SHEARS

See Shears, Power

PREHEATERS, FUEL OIL

• American District Steam Co., North To nawanda, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., Inc., J. P., Mt. Vernon, Ill.
Downingtown Iron Works, Downingtown, Pa.
Engineer Co., New York, N. Y.
Frank Heaters, Inc., Paterson, N. J.
• General Fittings Co., Providence, R. I.
Griscom-Russell Co., New York, N. Y.
Heat Transfer Products, Inc., Carbondale, Pa.
Hynes Electric Heating Co., Camden, N. J.
• Johnson Corp., Three Rivers, Mich.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
Oil Heat Master National Sales, New York, N. Y.
• Paterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Semet-Solvay Engineering Corp., New York, N. Y.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Staples & Pfeiffer, San Francisco, Calif.
Struthers Wells Corp., Titusville, Pa.
Taco Heaters, Inc., New York, N. Y.
• Thrush & Co., H. A., Peru, Ind.
Trent Co., Harold E., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Warren Electric Appliance Co., Warren, Pa.
Whitlock Mfg. Co., Hartford, Conn.
• Wiegand Co., Edwin L., Pittsburgh, Pa. (Electric)
Zallea Brothers & Johnson, Wilmington, Del.

PREHEATERS AND STRESS RELIEVERS, ELECTRIC, FOR PIPE WELDS

Electric Arc, Inc., Newark, N. J.
Falcon Equipment Co., New Brighton, Pa.
Hynes Electric Heating Co., Camden, N. J.
Kuhlman Electric Co., Detroit Electric Furnace Div., Bay City, Mich.
Trent Co., Harold E., Philadelphia, Pa.

PRE-INSULATED PIPE

See Pipe, Pre-Insulated

PRESSURE BLOWERS

See Blowers, High Pressure

PRESSURE CONTROLLERS

See Regulators, Pressure

PRESSURE GAGES

See Gages, Indicating, Pressure

PRESSURE INDICATOR-CONTROLLERS

See Indicator-Controllers, Pressure

PRESSURE RECORDER-CONTROLLERS

See Recorder-Controllers, Pressure

PRESSURE RECORDERS

See Recorders, Pressure and Vacuum

PRESSURE REDUCING VALVES

See Valves, Pressure Reducing and Regulating

PRESSURE REGULATING VALVES

See Valves, Pressure Reducing and Regulating

PRESSURE REGULATORS

See Regulators, Pressure

PRESSURE SWITCHES

See Switches, Pressure and Vacuum

PROCESS HEATING SYSTEMS

See Systems, Process Heating, High Temperature

PROCESS STEAM SUPERHEATERS

See Superheaters, Process Steam

PROCESS AND STORAGE TANKS

See Tanks, Process and Storage

PROPELLER FANS

See Fans, Propeller

PROPELLER PUMPS

See Pumps, Propeller

PROPORTIONING PUMPS

See Pumps, Proportioning

PROTECTIVE COATINGS

See Coatings, Protective, for Metal

PROTECTORS, PIPE COVERING

• American District Steam Co., North Tonawanda, N. Y.
Carpenter & Paterson, Inc., East Boston, Mass.
• Grinnell Co., Inc., Providence, R. I.
Ric-wiL Co., Cleveland, O.

PSYCHROMETERS, SLING AND HAND ASPIRATED

American Moistening Co., Providence, R. I.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
General Scientific Equipment Co., Philadelphia, Pa.
• Grinnell Co., Inc., Providence, R. I.
H-B Instrument Co., Philadelphia, Pa.
Hill, E. Vernon, Chicago, Ill.
• Johnson Service Co., Milwaukee, Wis.
• Leeds & Northrup Co., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Co., Cincinnati (Norwood), O.
Parks-Cramer Co., Fitchburg, Mass.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.

PSYCHROSTATS

See Humidistats

PULLEYS AND SHEAVES, FOR BELT DRIVES

• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Browning Mfg. Co., Inc., Maysville, Ky.
Congress Die Casting Div., Congress Tool & Die Co., Detroit, Mich.
Dayton Rubber Mfg. Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J. (Steel split)
Doall Co., The, Des Plaines, Ill.
Gates Rubber Co., The, Denver, Colo.
Goldens' Foundry & Machine Co., Columbus, Ga. (Cast iron)
Ideal Commutator Dresser Co., Sycamore, Ill.
• Lau Blower Co., Dayton, O.
Lewellen Mfg. Co., Columbus, Ind.
• Maurey Mfg. Corp., Chicago, Ill.
Pyott Foundry & Machine Co., Chicago, Ill.
Rockwood Mfg. Co., Indianapolis, Ind.
Scientific Tool Co., Dayton O. (variable pitch)
Swift Mfg. Co., Detroit, Mich. (Cast iron)
Thermoid Rubber, Div. of Thermoid Co., Trenton, N. J.
Utility Appliance Corp., Los Angeles, Calif.
Webster Electric Co., Racine, Wis.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

PULVERIZED COAL BURNERS

See Burners, Pulverized Coal

PUMP BASES

See Bases and Pads, Vibration Isolating

PUMP VALVES

See Valves, Pump

PUMPS, BOILER FEED

Acker Organization, Inc., W. M., Cleveland, O.
Aldrich Pump Co., Allentown, Pa.
• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Austin-Mason Co., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
• Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
Cissell Mfg. Co., W. M., Louisville, Ky.
Columbus Steam Pump Wks. Co., Columbus, O.
Davidson Co., M. T., Brooklyn, N. Y.
Dayton-Dowd Co., Quincy, Ill.
• Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
• Decatur Pump Co., Decatur, Ill.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
• Eagan Co., Walter H., Philadelphia, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
Economy Pumps, Inc., Hamilton, O.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Works, Inc., Brooklyn, N. Y.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Johnson Corp., Three Rivers, Mich.
Kimball-Krogh Pump Div., Food Machinery Corp., Los Angeles, Calif.

• Advertisement in this issue. See Index to Advertisers, pages 367-368.

Kingsford Foundry & Machine Wks., Oswego, N. Y.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lawrence Pump & Engine Co., Lawrence, Mass.
Lecourtenay Co., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
• McDonnell & Miller, Inc., Chicago, Ill.
Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
Morris Machine Works, Baldwinsville, N. Y.
• Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
Oberdorfer Brass Co., M. L., Syracuse, N. Y.
Pacific Pump Works, Huntington Park, Calif.
• Peerless Pumps Div., Food Machinery Corp., Los Angeles, Calif.
Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Riddell, Inc., W. A., Frederick, Md.
Robbins & Myers, Inc., Springfield, O.
• Schaub Engineering Co., Fred H., Chicago, Ill.
Sellers Engineering Co., Chicago, Ill.
Skidmore Corp., St. Joseph, Mich.
• Sterling, Inc., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Swgby Mfg. Co., Chicago, Ill.
• Templeton Bros., Inc., Walpole, Mass.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Well Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Whittington Pump & Engineering Co., Indianapolis, Ind.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, CENTRIFUGAL

Aldrich Pump Co., Allentown, Pa.
Allen Billmyre Co., Mamaroneck, N. Y.
• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
American Metal Products Co., Fort Worth, Tex.
American Well Wks., Aurora, Ill.
• Ames Hydrovac, Inc., Brooklyn, N. Y.
Aurora Pump Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Barrett, Haentjens & Co., Hazleton, Pa.
Beach-Russ Co., New York, N. Y.
Beckett & Co., Thomas, Dallas, Tex.
• Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blaisdell Compressor Co., New York, N. Y.
• Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chain Belt Co., Milwaukee, Wis.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Davidson Co., M. T., Brooklyn, N. Y.
Dayton-Dowd Co., Quincy, Ill.
• Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
• Decatur Pump Co., Decatur, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
• Dunham Co., C. A., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
• Eagan Co., Walter H., Philadelphia, Pa.
Eastern Engineering Co., New Haven, Conn.
Economy Pumps, Inc., Hamilton, O.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Works, Inc., Brooklyn, N. Y.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Gardner-Denver Co., Quincy, Ill.
Gorman-Rupp Co., Mansfield, O.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Kimball-Krogh Pump Div., Food Machinery Corp., Los Angeles
Calif.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
La Bour Co., Inc., The, Elkhart, Ind.
Lawrence Pump & Engine Co., Lawrence, Mass.
Lecourtenay Co., Newark, N. J.
Lewis & Co., Inc., Chas. S., St. Louis, Mo.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard hubber)
• Morey, Dan, Los Angeles, Calif. (recirculating for evaporative
coolers)
Morris Machine Works, Baldwinsville, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
National Carbon Co., New York, N. Y.
Oberdorfer Brass Co., M. L., Syracuse, N. Y.
Pacific Pump Works, Huntington Park, Calif.
Palmer Electric Co., Detroit, Mich.
• Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Quimby Pump Div., H. K. Porter Co., Inc., Newark, N. J.
Red Jacket Mfg. Co., Davenport, Ia.
Riddell, Inc., W. A., Frederick, Md.
Ruthman Machinery Co., Cincinnati, O.
Schneible Co., Claude B., Detroit, Mich.
Schwitzer-Cummins Co., Indianapolis, Ind.
Skidmore Corp., St. Joseph, Mich.
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Buffalo, N. Y.
Tampa Shipbuilding Co., Pump and Tank Div., Tampa, Fla.
• Templeton Bros., Inc., Walpole, Mass.
• Trane Co., The, La Crosse, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Utility Appliances Corp., Los Angeles, Calif.
Warren Steam Pump Co., Inc., Warren, Mass.
Well Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Whittington Pump & Engineering Co., Indianapolis, Ind.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, CONDENSATION RETURN

Aldrich Pump Co., Allentown, Pa.
• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
• Ames Hydrovac, Inc., Brooklyn, N. Y.
Aurora Pump Co., Aurora, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
• Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
Cissell Mfg. Co., W. M., Louisville, Ky.
Cochrane Corp., Philadelphia, Pa.
Columbus Steam Pump Wks. Co., Columbus, O.
Davidson Co., M. T., Brooklyn, N. Y.
Dayton-Dowd Co., Quincy, Ill.
• Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
• Decatur Pump Co., Decatur, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
• Dunham Co., C. A., Chicago, Ill.
• Eagan Co., Walter H., Philadelphia, Pa.
Eastern Engineering Co., New Haven, Conn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Economy Pumps, Inc., Hamilton, O.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Works, Inc., Brooklyn, N. Y.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Heating Assurance, Inc., Spokane, Wash.
• Hoffman Specialty Co., Indianapolis, Ind.
Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
• Johnson Corp., Three Rivers, Mich.
Kimball-Krogh Pump Div., Food Machinery Corp., Los Angeles,
Calif.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lawrence Pump & Engine Co., Lawrence, Mass.
Lecourtenay Co., Newark, N. J.
Lewis & Co., Inc., Chas. S., St. Louis, Mo.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
• Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
Oberdorfer Brass Co., M. L., Syracuse, N. Y.
O'Brien Steam Specialty Co., Syracuse, N. Y.
Pacific Pump Works, Huntington Park, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Quimby Pump Div., H. K. Porter Co., Inc., Newark, N. J.
Riddell, Inc., W. A., Frederick, Md.
• Schaub Engineering Co., Fred H., Chicago, Ill.
Sellers Engineering Co., Chicago, Ill.
Skidmore Corp., St. Joseph, Mo.
• Sterling, Inc., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Swaby Mfg. Co., Chicago, Ill.
• Templeton Bros., Inc., Walpole, Mass.
• Trane Co., The, La Crosse, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Well Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Whittington Pump & Engineering Co., Indianapolis, Ind.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, DEEP WELL, TURBINE

American-Marsh Pumps, Inc., Battle Creek, Mich.
American-Well Wks., Aurora, Ill.
Aurora Pump Co., Aurora, Ill.
Byron Jackson Co., Los Angeles, Calif.
Cook, Inc., A. D., Lawrenceburg, Ind.
Davidson Co., M. T., Brooklyn, N. Y.
• Decatur Pump Co., Decatur, Ill. (shallow well)
Deming Co., Salem, O.
• Eagan Co., Walter H., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Fairbanks Morse & Co., Pomona Works, Pomona, Calif.
Guild & Garrison, Inc., Brooklyn, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Kimball-Krogh Pump Div., Food Machinery Corp., Los Angeles,
Calif.
Layne & Bowler, Inc., Memphis, Tenn.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Pacific Pump Works, Huntington Park, Calif.
• Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Red Jacket Mfg. Co., Davenport, Ia.
Worthington Pump & Machinery Corp., Harrison, N. J.

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PUMPS, FIRE

• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blackmer Pump Co., Grand Rapids, Mich.
• Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
Dayton-Dowd Co., Quincy, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
Economy Pumps, Inc., Hamilton, O.
Fairbanks, Morse & Co., Chicago, Ill.
Fairbanks Morse & Co., Pomona Works, Pomona, Calif.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Gorman-Rupp Co., Mansfield, O.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Kimball-Krogh Pump Div., Food Machinery Corp., Los Angeles, Calif.
Lecourtenay Co., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Morris Machine Wks., Baldwinsville, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
Oberdorfer Brass Co., M. L., Syracuse, N. Y.
• Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Viking Pump Co., Cedar Falls, Ia.
Warren Steam Pump Co., Inc., Warren, Mass.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, LIQUID REFRIGERANT CIRCULATING

Aurora Pump Co., Aurora, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
• Eagan Co., Walter H., Philadelphia, Pa.
Economy Pumps, Inc., Hamilton, O.
Fairbanks Morse & Co., Chicago, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Kimball-Krogh Pump Div., Food Machinery Corp., Los Angeles, Calif.
Lewis & Co., Chas. S., St. Louis, Mo.
Pacific Pump Works, Huntington Park, Calif.
• Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Red Jacket Mfg. Co., Davenport, Ia.
Roper Corp., Geo. D., Rockford, Ill.
Vilter Mfg. Co., Milwaukee, Wis.
Warren Steam Pump Co., Inc., Warren, Mass.
Weinman Pump Mfg. Co., The, Columbus, O.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, PROPELLER

Byron Jackson Co., Los Angeles, Calif.
Fairbanks Morse & Co., Pomona Works, Pomona, Calif.
Jackson Co., Byron, Los Angeles, Calif.
Kimball-Krogh Pump Div., Food Machinery Corp., Los Angeles, Calif.
Pacific Pump Works, Huntington Park, Calif.
• Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Ruthman Machinery Co., Cincinnati, O.

PUMPS, PROPORTIONING

Blackburn-Smith Mfg. Co., Hoboken, N. J.
Cochrane Corp., Philadelphia, Pa.
Dearborn Chemical Co., Chicago, Ill.
Haering Co., Inc., D. W., Chicago, Ill.
Jabsco Pump Co., Beverly Hills, Calif.
Nelson Chemical Pumps, Casper, Wyo.
% Proportioneers, Inc. %, Providence, R. I.
Roy Pumps, Milton, Philadelphia, Pa.
Wallace & Tiernan Co., Inc., Newark, N. J.

PUMPS, RECIPROCATING

Aldrich Pump Co., Allentown, Pa.
Alten's Foundry & Machine Works, Lancaster, O.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Austin-Mason Co., New York, N. Y.
• Buffalo Pumps, Inc., Buffalo, N. Y.
Columbus Steam Pump Wks., Columbus, O.
Davidson Co., M. T., Brooklyn, N. Y.
• Dean Brothers Pumps, Inc., Indianapolis, Ind.
Deming Co., Salem, O.
Devine Mfg. Co., Inc., J. P., Mt. Vernon, Ill.
Duro Co., Dayton, O.
• Eagan Co., Walter H., Philadelphia, Pa.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pumps Wks., Inc., Brooklyn, N. Y.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Ingersoll-Rand Co., New York, N. Y.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Myers & Bro. Co., F. E., The, Ashland, O.
National Steam Pump Co., Upper Sandusky, O.
Red Jacket Mfg. Co., Davenport, Ia.
Roy Pumps, Milton, Philadelphia, Pa.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
• Watson-Stillman Co., Roselle, N. J.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, ROTARY

Allen Billmyre Co., Mamaroneck, N. Y.
American Hard Rubber Co., New York, N. Y. (Hard rubber)
Beach-Russ Co., New York, N. Y.
Blackmer Pump Co., Grand Rapids, Mich.
Bowser, Inc., Fort Wayne, Ind.
Bump Pump Co., La Crosse, Wis.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
• Eagan Co., Walter H., Philadelphia, Pa.
Eastern Engineering Co., New Haven, Conn.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Kimball-Krogh Pump Div., Food Machinery Corp., Los Angeles, Calif.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lammert & Mann Co., Chicago, Ill.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
• Martocello & Co., Jos. A., Philadelphia, Pa.
May Oil Burner Corp., Baltimore, Md.
• McIntyre Co., The, Newton, Mass.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
• Nash Engineering Co., South Norwalk, Conn.
Oberdorfer Brass Co., M. L., Syracuse, N. Y.
• Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Quimby Pump Div., H. K. Porter Co., Inc., Newark, N. J.
Red Jacket Mfg. Co., Davenport, Ia.
Robbins & Myers, Inc., Springfield, O.
Roots-Connersville Blower Corp., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
St. Louis Tool Co., St. Louis, Mo.
Schutte & Koerting Co., Philadelphia, Pa.
Scott-Newcomb, Inc., St. Louis, Mo.
Sundstrand Machine Tool Co., Pump Div., Rockford, Ill.
Taber Pump Co., Buffalo, N. Y.
Trimount Rotary Power Co., East Dedham, Mass.
Tuthill Pump Co., Chicago, Ill.
Viking Pump Co., Cedar Falls, Ia.
Webster Electric Co., Racine, Wis.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yale & Towne Mfg. Co., Stamford, Conn.

PUMPS, SEWAGE AND SLUDGE

American-Marsh Pumps, Inc., Battle Creek, Mich.
American Well Works, Aurora, Ill.
Aurora Pump Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
• Eagan Co., Walter H., Philadelphia, Pa.
Economy Pumps, Inc., Hamilton, O.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Kimball-Krogh Pump Div., Food Machinery Corp., Los Angeles, Calif.
Kingsford Foundry & Machine Works, Oswego, N. Y.
• Nash Engineering Co., South Norwalk, Conn.
Quimby Pump Div., H. K. Porter Co., Inc., Newark, N. J.
Swaby Mfg. Co., Chicago, Ill.
Tampa Shipbuilding Co., Pump and Tank Div., Tampa, Fla.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, STEAM

American-Marsh Pumps, Inc., Battle Creek, Mich.
Austin-Mason Co., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
• Buffalo Pumps, Inc., Buffalo, N. Y.
Columbus Steam Pump Wks. Co., Columbus, O.
Davidson Co., M. T., Brooklyn, N. Y.
• Dean Brothers Pumps, Inc., Indianapolis, Ind.
• Eagan Co., Walter H., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Gardner-Denver Co., Quincy, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
National Steam Pump Co., Upper Sandusky, O.
• Templeton Bros., Inc., Walpole, Mass.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
• Watson-Stillman Co., Roselle, N. J.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, SUMP

• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Austin-Mason Co., New York, N. Y.

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Blackburn-Smith Mfg. Co., Hoboken, N. J.
• Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pneumatic Tool Co., New York, N. Y.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Davidson Co., M. T., Brooklyn, N. Y.
Dayton-Dowd Co., Quincy, Ill.
Dean Hill Pump Co., Indianapolis, Ind.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
Duro Co., Dayton, O.
• Eagan Co., Walter H., Philadelphia, Pa.
Eastern Engineering Co., New Haven, Conn.
Economy Pumps, Inc., Hamilton, O.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Fairbanks Morse & Co., Pomona Works, Pomona, Calif.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Gorman-Rupp Co., Mansfield, O.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Imperial Brass Mfg. Co., Chicago, Ill.
Independent Pneumatic Tool Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Beverly Hills, Calif.
Jackson Co., Byron, Los Angeles, Calif.
Kimball-Krogh Pump Div., Food Machinery Corp., Los Angeles, Calif.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Lawrence Pump & Engine Co., Lawrence, Mass.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Morris Machine Wks., Baldwinsville, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
Noera Mfg. Co., Div. Chase Brass & Copper Co., Waterbury, Conn.
Oberdorfer Brass Co., M. L., Syracuse, N. Y.
Pacific Pump Works, Huntington Park, Calif.
• Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Penberthy Injector Co., Detroit, Mich.
Quimby Pump Div., H. K. Porter Co., Inc., Newark, N. J.
Red Jacket Mfg. Co., Davenport, Ia.
Riddell, Inc., W. A., Frederick, Md.
Schneible Co., Claude B., Detroit, Mich.
Schutte & Koerting Co., Philadelphia, Pa.
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Buffalo, N. Y.
Triplex Heating Specialty Co., Peru, Ind.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Wade Mfg. Co., Elgin, Ill.
Warren Steam Pump Co., Inc., Warren, Mass.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Westco Pumps, Fairbanks, Morse & Co., St. Louis, Mo.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, VACUUM

Allen Billmyre Co., Mamaroneck, N. Y.
• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Automatic Typewriter Co., Chicago, Ill.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Austin-Mason Co., New York, N. Y.
Beach-Russ Co., New York, N. Y.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
Chicago Pump Co., Chicago, Ill.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davidson Co., M. T., Brooklyn, N. Y.
• Dean Brothers Pumps, Inc., Indianapolis, Ind.
Devine Mfg. Co., Inc., J. P., Mt. Vernon, Ill.
• Dunham Co., C. A., Chicago, Ill.
• Eagan Co., Walter H., Philadelphia, Pa.
Economy Pumps, Inc., Hamilton, O.
Eisler Engineering Corp., Newark, N. J.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Foster Wheeler Corp., New York, N. Y.
Fuller Co., Catasauqua, Pa.
Gardner-Denver Co., Quincy, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Kimball-Krogh Pump Div., Food Machinery Corp., Los Angeles, Calif.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lammert & Mann Co., Chicago, Ill.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
• Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
• Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Skidmore Corp., St. Joseph, Mich.
• Sterling, Inc., Milwaukee, Wis.
Stokes Machine Co., F. J., Philadelphia, Pa.
Trimount Rotary Power Co., East Dedham, Mass.
Union Steam Pump Co., Battle Creek, Mich.
Viking Pump Co., Cedar Falls, Ia.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Whittington Pump & Engineering Co., Indianapolis, Ind.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, VACUUM HEATING

American-Marsh Pumps, Inc., Battle Creek, Mich.
• Ames Hydrovac, Inc., Brooklyn, N. Y.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Domestic Engine & Pump Co., Shippensburg, Pa.
• Dunham Co., C. A., Chicago, Ill.
• Eagan Co., Walter H., Philadelphia, Pa.
Economy Pumps, Inc., Hamilton, O.
Gardner-Denver Co., Quincy, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
Gylstrom Co., O., Milwaukee, Wis.
• Hoffman Specialty Co., Indianapolis, Ind.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
• Nash Engineering Co., South Norwalk, Conn.
Roots-Connersville Blower Corp., Connersville, Ind.
Skidmore Corp., St. Joseph, Mich.
• Sterling, Inc., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
• Templeton Bros., Inc., Walpole, Mass.
• Trane Co., The, LaCrosse, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Whittington Pump & Engineering Co., Indianapolis, Ind.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, VISCOUS LIQUIDS AND HEAVY MATERIALS

Aldrich Pump Co., Allentown, Pa.
• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Austin-Mason Co., New York, N. Y.
Beach-Russ Co., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blackmer Pump Co., Grand Rapids, Mich.
• Buffalo Pumps, Inc., Buffalo, N. Y.
Bump Pump Co., La Crosse, Wis.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Davidson Co., M. T., Brooklyn, N. Y.
• Dean Brothers Pumps, Inc., Indianapolis, Ind.
• Eagan Co., Walter H., Philadelphia, Pa.
Economy Pumps, Inc., Hamilton, O.
Engineer Co., New York, N. Y.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Beverly Hills, Calif.
Jackson Co., Byron, Los Angeles, Calif.
Kimball-Krogh Pump Div., Food Machinery Corp., Los Angeles, Calif.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lawrence Pump & Engine Co., Lawrence, Mass.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Morris Machine Wks., Baldwinsville, N. Y.
Pacific Pump Works, Huntington Park, Calif.
Quimby Pump Div., H. K. Porter Co., Inc., Newark, N. J.
Red Jacket Mfg. Co., Davenport, Ia.
Riddell, Inc., W. A., Frederick, Md.
Robbins & Myers, Inc., Springfield, O.
Roots-Connersville Blower Corp., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
Roy Pumps, Milton, Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Taber Pump Co., Buffalo, N. Y.
Tuthill Pump Co., Chicago, Ill.
Union Steam Pump Co., Battle Creek, Mich.
Viking Pump Co., Cedar Falls, Ia.
Warren Steam Pump Co., Inc., Warren, Mass.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUNCHES, SHEET METAL

Beatty Machine & Mfg. Co., Hammond, Ind.
Bertsch & Co., Inc., Cambridge City, Ind.
Bliss Co., E. W., Toledo, O.
C-B Tool Co., Lancaster, Pa.
Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Cleveland Punch & Shear Wks. Co., Cleveland, O.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Henry & Wright Mfg. Co., Hartford, Conn.
International Nutyp Tool Co., Oswego, N. Y.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
New Albany Machine Mfg. Co., New Albany, Ind.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Parker-Kalon Corp., New York, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Perkins Machine Co., Warren, Mass.

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Royersford Foundry & Machine Co., Inc., Royersford, Pa.
Service Machine Co., Elizabeth, N. J.
Swaine Mfg. Co., Fred J., St. Louis, Mo.
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.
Wiedemann Machine Co., Philadelphia, Pa.
Zeh & Hahnemann Co., Newark, N. J.

PURGERS, REFRIGERANT GAS

• Armstrong Machine Works, Three Rivers, Mich.
Frick Co., Waynesboro, Pa.
Vilter Mfg. Co., Milwaukee, Wis.

PUSHERS, PIPE, HYDRAULIC

Blackhawk Mfg. Co., Milwaukee, Wis.
Greenlee & Company.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Dudgeon, Inc., Richard, New York, N. Y.

RADIATION BASEBOARD, FERROUS

• Burnham Boiler Corp., Irvington, N. Y.
• Crane Co., Chicago, Ill.

RADIATION, BASEBOARD, NON-FERROUS

• Webster & Co., Warren, Camden, N. J.

RADIANT HEAT THERMOSTATS

See Thermostats, Radiant Heat

RADIATION, CONVECTION TYPE, FERROUS

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Beacon-Morris Corp., Boston, Mass.
• Crane Co., Chicago, Ill.
• Dunham Co., C. A., Chicago, Ill.
• Mario Coil Co., St. Louis, Mo.
• Murray Mfg. Co., D. J., Wausau, Wis.
• National Radiator Co., The, Johnstown, Pa.
Refrigeration Economics Co., Inc., Canton, O.
Richmond Radiator Co., Gas Products Div., Uniontown, Pa.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
United States Radiator Corp., Detroit, Mich.
Utica Radiator Corp., Utica, N. Y.
• Vulcan Radiator Co., Hartford, Conn.
Weil-McLain Co., Chicago, Ill.
• Young Radiator Co., Racine, Wis.

RADIATION, CONVECTION TYPE, NON-FERROUS

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Beacon-Morris Corp., Boston, Mass.
• Bush Mfg. Co., Hartford, Conn.
• Dunham Co., C. A., Chicago, Ill.
• Extended Surface, Div. of David E. Kennedy, Inc., Brooklyn, N. Y.
G. & O. Mfg. Co., New Haven, Conn.
Kehm Corp., The., Chicago, Ill.
• McQuay, Inc., Minneapolis, Minn.
• Modine Mfg. Co., Racine, Wis.
Refrigeration Economics Co., Inc., Canton, O.
Rome-Turney Radiator Co., Rome, N. Y.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
Super Radiator Corp., Minneapolis, Minn.
• Trane Co., The, La Crosse, Wis.
• Tuttle & Bailey, Inc., New Britain, Conn.
Vapor Car Heating Co., Inc., Chicago, Ill.
• Vulcan Radiator Co., Hartford, Conn.
Webster & Co., Warren, Camden, N. J.
• Young Radiator Co., Racine, Wis.

RADIATION, DIRECT

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
• Burnham Boiler Corp., Irvington, N. Y.
Clifford Mfg. Co., Boston, Mass. (For aircraft)
Clow & Sons, James B., Chicago, Ill. (Gas fired)
Columbia Radiator Co., McKeesport, Pa.
• Crane Co., Chicago, Ill.
Fowler & Wolfe Radiator Co., Norristown, Pa.
Kohler Co., Kohler, Wis.
• Murray Mfg. Co., D. J. Wausau, Wis.
• National Radiator Co., The, Johnstown, Pa.
Slater Mfg. Co., Wakefield, Mass. (Baseboard)
• Smith Co., Inc., H. B., The, Westfield, Mass.
Thatcher Furnace Co., Garwood, N. J.
United States Radiator Corp., Detroit, Mich.
Utica Radiator Corp., Utica, N. Y.
Weil-McLain Co., Chicago, Ill.

RADIATOR AND CONVECTOR HUMIDIFIERS

See Humidifiers for Radiators and Convectors

RADIATOR HANGERS

See Hangers or Brackets, Radiator

RADIATOR ORIFICE VALVES

See Valves, Radiator, Orifice

RADIATOR ORIFICES

See Orifices, Radiator

RADIATOR SLIPS, NIPPLE

See Nipple, Radiator, Slip

RADIATOR VALVES

See Valves, Radiator

RADIATOR VENT VALVE HUMIDIFIERS

See Humidifiers, Radiator Vent Valve

RADIATORS, GAS FIRED

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Automatic Gas Equipment Co., Pittsburgh, Pa.

RADIATORS, HUMIDIFYING

• Murray Mfg. Co., D. J. Wausau, Wis.
Utica Radiator Corp., Utica, N. Y.

RATCHET WRENCHES

See Wrenches, Ratchet

REAMERS, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Crown Die & Tool Co., Chicago, Ill.
Greenfield Tap & Die Corp., Greenfield, Mass.
Independent Pneumatic Tool Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
Nye Tool & Machine Co., Chicago, Ill.
Sac Tool Mfg. Co., St. Louis, Mo.
Toledo Pipe Threading Machine Co., Toledo, O.

RECIPROCATING PUMPS

See Pumps, Reciprocating

RECORDER-CONTROLLERS, COMBINED TEMPERATURE AND HUMIDITY

American Schaeffer & Budenberg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Ess Instrument Co., Fort Lee, N. J.
Foxboro Co., Foxboro, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
• Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.

RECORDER-CONTROLLERS, HUMIDITY

American Schaeffer & Budenberg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
• Barber-Colman Co., Rockford, Ill.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
• Johnson Service Co., Milwaukee, Wis.
• Leeds & Northrup Co., Philadelphia, Pa.
Mason-Neilan Regulator Co., Boston, Mass.
• Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.

RECORDER-CONTROLLERS, PRESSURE

American Schaeffer & Budenberg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Bailey Meter Co., Cleveland, O.
Baldwin Locomotive Wks., Eddystone, Pa.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., New York, N. Y.
• Hays Corp., Michigan City, Ind.
Mason-Neilan Regulator Co., Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.

RECORDER-CONTROLLERS, TEMPERATURE

American Schaeffer & Budenberg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Bailey Meter Co., Cleveland, O.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Elmer & Amend, New York, N. Y.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., New York, N. Y.
• Johnson Service Co., Milwaukee, Wis.
• Leeds & Northrup Co., Philadelphia, Pa.
Marsh Corp., Jas. P., Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
• Powers Regulator Co., Chicago, Ill.
Pyrometer Instrument Co., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.

RECORDERS, CARBON DIOXIDE

American Schaeffer & Budenberg Instrument Div., Manning

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Maxwell & Moore, Inc., Bridgeport, Conn.
Defender Instrument and Regulator Co., St. Louis, Mo.
Engelhard, Inc., Charles, Newark, N. J.
Foxboro Co., Foxboro, Mass.
• Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
• Leeds & Northrup Co., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Precision Control Co., San Francisco, Calif.
Republic Flow Meters Co., Chicago, Ill.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Uehling Instrument Co., Paterson, N. J.

RECORDERS, COMBINED TEMPERATURE AND HUMIDITY

American Schaeffer & Budenberg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Bristol Co, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Mason-Neilan Regulator Co., Boston, Mass.
Moeller Instrument Co., Richmond Hill, N. Y.
• Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.

RECORDERS, DRAFT

American Schaeffer & Budenberg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
• Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Mason-Neilan Regulator Co., Boston, Mass.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

RECORDERS, HUMIDITY

Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
H-B Instrument Co., Philadelphia, Pa.
• Leeds & Northrup Co., Philadelphia, Pa.
Mason-Neilan Regulator Co., Boston, Mass.
Moeller Instrument Co., Richmond Hill, N. Y.
• Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.

RECORDERS, LIQUID LEVEL

Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Cochrane Corp., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
• Leeds & Northrup Co., Philadelphia, Pa.
Liquidometer Corp., Long Island City, N. Y.
Mason-Neilan Regulator Co., Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Uehling Instrument Co., Paterson, N. J.
Westinghouse Electric Corp., East Pittsburgh, Pa.

RECORDERS, PRESSURE AND VACUUM

American Schaeffer & Budenberg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Baldwin Locomotive Wks., Eddystone, Pa.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Cochrane Corp., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Electric Auto-Lite Co., Instrument & Gauge Div., La Crosse, Wis.
Foxboro Co., Foxboro, Mass.
• Hays Corp., Michigan City, Ind.
• Leeds & Northrup Co., Philadelphia, Pa.
Marsh Corp., Jas. P., Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
Moeller Instrument Co., Richmond Hill, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Co., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.

RECORDERS, TEMPERATURE

American Schaeffer & Budenberg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Cochrane Corp., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Electric Auto-Lite Co., Instrument & Gauge Div., La Crosse, Wis.
Engelhard, Inc., Charles, Newark, N. J.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
H-B Instrument Co., Philadelphia, Pa.
• Hays Corp., Michigan City, Ind.
• Leeds & Northrup Co., Philadelphia, Pa.
Marsh Corp., Jas. P., Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Co., Cincinnati (Norwood), O.
• Powers Regulator Co., Chicago, Ill.
Precision Scientific Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrometer Instrument Co., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.

RECORDING THERMOMETERS

See Recorders, Temperature

RECOVERY EQUIPMENT, AIR

See Adsorbers, Odor

REDUCERS, SPEED

• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Bodine Electric Co., Chicago, Ill.
Boston Gear Wks., Inc., North Quincy, Mass.
De Laval Steam Turbine Co., Trenton, N. J.
General Electric Co., Schenectady, N. Y.
Graham Transmissions, Inc., Milwaukee, Wis.
Ideal Commutator Dresser Co., Sycamore, Ill.
• Janette Mfg. Co., Chicago, Ill.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Link Belt Co., Philadelphia, Pa.
Medart Co., St. Louis, Mo.
Moore Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.
Morse Chain Co., Ithaca, N. Y. (Chain speed)
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Poole Foundry & Machine Co., Baltimore, Md.
Smith, Inc., Winfield H., Springville, N. Y.
Star Electric Motor Co., Bloomfield, N. J.
• Stephens-Adamson Mfg. Co., Aurora, Ill.
Westinghouse Electric Corp., East Pittsburgh, Pa.

REFRACTORIES AND REFRACTORY CEMENT

Babcock & Wilcox Co., New York, N. Y.
Basic Refractories, Inc., Cleveland, O.
Bird-Archer Co., Philadelphia, Pa.
Botfield Refractories Co., Philadelphia, Pa.
Chicago Fire Brick Co., Chicago, Ill.
Commonwealth Products Co., Philadelphia, Pa.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Fireline Stove & Furnace Lining Co., Chicago, Ill.
General Insulating Products Co., Brooklyn, N. Y.
Gilbert & Son, Harry E., Bridgeport, Conn.
Green Fire Brick Co., A. P., Mexico, Mo.
Johns-Manville, New York, N. Y.
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Ludowici-Celadon Co., Chicago, Ill. (Insulating)
McLeod & Henry Co., Inc., Troy, N. Y.
Munn and Steele, Inc., Newark, N. J.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Rex Clay Products Co., Detroit, Mich.
Ruberoid Co., New York, N. Y.
• Rutland Fire Clay Co., Rutland, Vt.
Standard Fuel Engineering Co., Detroit, Mich.
Taylor Sons Co., Charles, Cincinnati, O.

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United States Stoneware Co., New York, N. Y.
Universal Zonolite Insulation Co., Chicago, Ill.
Walsh Refractories Corp., St. Louis, Mo.

REFRIGERANT DEHYDRATORS

See Dehydrators, Refrigerant

REFRIGERANT, FILTERS

See Filters, Refrigerant

REFRIGERANT GAS PURGERS

See Purgers, Refrigerant Gas

REFRIGERANTS

Ansul Chemical Co., Marinette, Wis. (methyl chloride, sulphur dioxide)
Armour Ammonia Wks., Chicago, Ill. (ammonia)
Carbide and Carbon Chemicals Corp., New York, N. Y. (Butane, isobutane, propane, ethane)
du Pont de Nemours & Co., Inc., E. I., Ammonia Dept., Wilmington, Del. (ammonia, sulphur dioxide, methyl chloride, "Freon")
du Pont de Nemours & Co., Inc., E. I., Electrochemicals Dept., Wilmington, Del. (Methyl chloride and methylene chloride)
Kinetic Chemicals, Inc., Wilmington, Del. ("Freon," fluorine)
Liquid Carbonic Corp., Chicago, Ill. (carbon dioxide)
Pennsylvania Salt Mfg. Co., Philadelphia, Pa. (ammonia)
Pure Carbonic, Inc., New York, N. Y. (carbon dioxide)
Solvay Sales Corp., New York, N. Y.
Virginia Smelting Co., West Norfolk, Va. (Methyl chloride, liquid sulphur dioxide, methylene chloride)

REFRIGERATING COMPRESSORS

See Compressors, Refrigerating

REFRIGERATION ACCUMULATORS

See Accumulators, Refrigeration

REFRIGERATION CONTROLS

See Valves, Refrigeration

REFRIGERATION FITTINGS

See Fittings, Refrigeration

REFRIGERATION MANIFOLDS

See Manifolds, Refrigeration

REFRIGERATION VALVES

See Valves, Refrigeration

REGISTERS

See also Diffusers; Grilles; Panels, Perforated, for Air Diffusion

A-J Mfg. Co., Kansas City, Mo.
Air Control Products, Inc., Coopersville, Mich.
Air-O-Fin Register Co., Detroit, Mich.
• Auer Register Co., Cleveland, O.
• Barber-Colman Co., Rockford, Ill.
Best Register Co., Milwaukee, Wis.
Char-Gale Mfg. Co., Minneapolis, Minn.
Controlair Mfg. Co., Los Angeles, Calif.
Diamond Mfg. Co., Wyoming, Pa.
Eaglesfield Ventilator Co., Indianapolis, Ind. (wood)
Elsey Metal Specialties Co., Detroit, Mich.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Gillian Mfg. Co., Detroit, Mich.
Hart & Cooley Mfg. Co., Holland, Mich.
Hendrick Mfg. Co., Carbondale, Pa.
Independent Register Co., Cleveland, O.
Knowles Mushroom Ventilator Co., Montclair, N. J.
Middleton Mfg. & Sales Co., Minneapolis, Minn.
• Mueller Furnace Co., L. J., Milwaukee, Wis.
Newman Bros., Inc., Cincinnati, O.
Palmer Mfg. Corp., Phoenix, Ariz.
Register & Grille Mfg. Co., Brooklyn, N. Y.
Rock Island Register Co., Rock Island, Ill.
• Standard Stamping & Perforating Co., Chicago, Ill.
Stewart Mfg. Co., Bloomfield, N. J.
• Tuttle & Bailey, Inc., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
• Waterloo Register Div. of Associated Manufacturers, Inc., Waterloo, Io.

REGULATORS, AIR VELOCITY

• Barber-Colman Co., Rockford, Ill.
• Johnson Service Co., Milwaukee, Wis.
• Powers Regulator Co., Chicago, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Shallcross Controls, Inc., Milwaukee, Wis.

REGULATORS, DAMPER SETS

Adams Co., The, Dubuque, Ia.
Air Control Products, Inc. Coopersville, Mich.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
• Automatic Products Co., Milwaukee, Wis.
• Barber-Colman Co., Rockford, Ill.
Cole-Sullivan Engineering Co., Minneapolis, Minn.
Fossum, M. H., St. Paul, Minn.
Gerett Corp., M. A., Milwaukee, Wis.
Goese Mfg. Co., Milwaukee, Wis.
Hart & Cooley Mfg. Co., Holland, Mich.
Joal Mfg. Corp., Toledo, O.
Kerentoff, G. L., Cincinnati, O.
• Kieley & Mueller, Inc., North Bergen, N. J.
Master Electric Co., Aircraft & Electrical Controls Div., Dayton, O.
• Mercoid Corp., The, Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Northern Weatherstrip Co., Duluth, Minn.
Ohio Products Co., Cleveland, O.
Parker-Kalon Corp., New York, N. Y.
• Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Richmond Radiator Co., Gas Products Div., Uniontown, Pa.
Sampsel Time Control, Inc., Spring Valley, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Shallcross Controls, Inc., Milwaukee, Wis.
• Trane Co., The, LaCrosse, Wis.
United States Register Co., Battle Creek, Mich.
• White-Rodgers Electric Co., St. Louis, Mo.
Young Regulator Co., Cleveland, O.

REGULATORS, DRAFT, COMBUSTION

Askania Regulator Co., Chicago, Ill.
• Autempco Corp., New York, N. Y.
Automatic Products Co., Milwaukee, Wis.
Bailey Meter Co., Cleveland, O.
Boiler Room Equipment, Inc., New York, N. Y.
Bristol Co., Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
• Cash Co., A. W., Decatur, Ill.
Cole-Sullivan Engineering Co. Minneapolis, Minn.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
Engineer Co., New York, N. Y.
Foster Engineering Co., Newark, N. J.
Foster Wheeler Corp., New York, N. Y.
Foxboro Co., Foxboro, Mass.
• Hagan Corp., Pittsburgh, Pa.
• Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland, O
• Illinois Engineering Co., Chicago, Ill.
• Kieley & Mueller, Inc., North Bergen, N. J.
• Leeds & Northrup Co., Philadelphia, Pa.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
Master Electric Co., Aircraft & Electrical Controls Div., Dayton, O.
Master Electric Co., Dayton, O.
• Mercoid Corp., The, Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
National Brass Co., Grand Rapids, Mich.
Perfex Corp., Milwaukee, Wis.
Precision Control Co., San Francisco, Calif.
Republic Flow Meters Co., Chicago, Ill. (Industrial)
Ruggles-Klingeman Mfg. Co., Salem, Mass.
Sampsel Time Control, Inc., Spring Valley, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Webster Engineering Co., Tulsa, Okla.
Wheelco Instruments Co., Chicago, Ill.

REGULATORS, PRESSURE, AIR

American Meter Co., Inc., New York, N. Y.
Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Inc., Newark, N. J.
• Barber-Colman Co., Rockford, Ill.
Belfield Co., H., Philadelphia, Pa.
Black Mfg. Co., The, Baltimore, Md.
Boylston Steam Specialty Co., Chicago, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
• Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Clark Mfg. Co., Cleveland, O.
• Cook Electric Co., Chicago, Ill.
Cooper Co, Clark, Palmyra, N. J.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
DeVilbiss Co., The, Toledo, O.
Dockson Corp., Detroit, Mich.
• Douglass Automatic Controls Co., South Gate, Calif.
• Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
• Fulton Sylphon Co., The, Knoxville, Tenn.
Grove Regulator Co., Oakland, Calif.
• Hagan Corp., Pittsburgh, Pa.
• Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland, O.
• Illinois Engineering Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Klipfel Mfg. Co., Chicago, Ill.
Leslie Co., Lyndhurst, N. J.
Mason-Neilan Regulator Co., Boston, Mass.
• McAlear Mfg. Co., Chicago, Ill.
• Mercoid Corp., The, Chicago, Ill.
Monitor Controller Co., The, Baltimore, Md.
Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.

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Norgren Co., C. A., Denver, Colo.
North Penn Co., New York, N. Y.
• Penn Electric Switch Co., Goshen, Ind.
Pittsburgh Equitable Meter Co., Pittsburgh, Pa.
R-S Products Corp., Philadelphia, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Spray Engineering Co., Somerville, Mass.
Square D Co., Detroit, Mich.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Strong, Carlisle & Hammond Co., Cleveland, O.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Thermac Company, Los Angeles, Calif.
Torchweld Equipment Div., National Cylinder Gas Co., Chicago, Ill.
Trerice Co., H. O., Detroit, Mich.
Tryco Products, Inc., Westfield, Mass.
United Electric Controls Co., Boston, Mass.
Victor Equipment Co., San Francisco, Calif.
Watson & McDaniel Co., Philadelphia, Pa.
Wheelco Instruments Co., Chicago, Ill.
• White-Rodgers Electric Co., St. Louis, Mo.

REGULATORS, PRESSURE, GAS

American Meter Co., Inc., New York, N. Y.
Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Inc., Newark, N. J.
• Barber-Colman Co., Rockford, Ill.
Barber Gas Burner Co., Cleveland, O.
Belfield Co., H., Philadelphia, Pa.
Black Mfg. Co., The, Baltimore, Md.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
• Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
• Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
Dockson Corp., Detroit, Mich.
• Douglass Automatic Controls Co., South Gate, Calif.
Eclipse Fuel Engineering Co., Rockford, Ill.
• Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Fox Control & Mfg. Co., Cleveland, O.
Foxboro Co., Foxboro, Mass.
• General Controls Co., Glendale, Calif.
Grove Regulator Co., Oakland, Calif.
• Hagan Corp., Pittsburgh, Pa.
• Hays Corp., Michigan City, Ind.
• Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
• Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Chicago, Ill.
Leslie Co., Lyndhurst, N. J.
Liquid Carbonic Corp., The, Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
• McAlear Mfg. Co., Chicago, Ill.
• Mercoid Corp., The, Chicago, Ill.
Monitor Controller Co., The, Baltimore, Md.
Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Norgren Co., C. A., Denver, Col.
Payne Furnace & Supply Co., Inc., Beverly Hills, Calif.
Pittsburgh Equitable Meter Co., Pittsburgh, Pa.
• Powers Regulator Co., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill. (Industrial)
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Sampsel Time Control, Inc., Spring Valley, Ill.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Square D Co., Detroit, Mich.
Staples & Pfeiffer, San Francisco, Calif.
Strong, Carlisle & Hammond Co., Cleveland, O.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Torchweld Equipment Div., National Cylinder Gas Co., Chicago, Ill.
Trerice Co., H. O., Detroit, Mich.
Victor Equipment Co., San Francisco, Calif.
Wall Chemicals Div. of The Liquid Carbonic Corp., Chicago, Ill.
Watson & McDaniel Co., Philadelphia, Pa.
Wheelco Instruments Co., Chicago, Ill.

REGULATORS, PRESSURE, HOT WATER HEATING SYSTEMS

• Barber-Colman Co., Rockford, Ill.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
• Bell & Gossett Co., Morton Grove, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
• Fisher Governor Co., Marshalltown, Ia.
• Illinois Engineering Co., Chicago, Ill.
Kainer Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
• McAlear Mfg. Co., Chicago, Ill.
• McDonnell & Miller, Inc., Chicago, Ill.
• Mercoid Corp., The, Chicago, Ill.
Mueller Co., Decatur, Ill.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Sacrotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Taco Heaters, Inc., New York, N. Y.
• Thrush & Co., H. A., Peru, Ind.
• Trane Co., The, LaCrosse, Wis.
Watts Regulator Co., Lawrence, Mass.
Wheelco Instruments Co., Chicago, Ill.
• White-Rodgers Electric Co., St. Louis, Mo.

REGULATORS, PRESSURE, LIQUID

Atlas Valve Co., Inc., Newark, N. J.
• Automatic Control Co., St. Paul, Minn.
Bailey Meter Co., Cleveland, O.
• Barber-Colman Co., Rockford, Ill.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Belfield Co., H., Philadelphia, Pa.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
• Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chaplin-Fulton Mfg Co., Pittsburgh, Pa.
Clark Controller Co., Cleveland, O.
• Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
• Douglass Automatic Controls Co., South Gate, Calif.
• Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Foxboro Co., Foxboro, Mass.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
• Hagan Corp., Pittsburgh, Pa.
• Hays Corp., Michigan City, Ind.
Healy Ruff Co., St. Paul, Minn.
• Illinois Engineering Co., Chicago, Ill.
• Johnson Service Co., Milwaukee, Wis.
Justus Steam Trap Co., Napanoch, N. Y.
Keckley Co., O. C., Chicago, Ill.
• Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Chicago, Ill.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Marsh Corp., Jas. P., Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
• McAlear Mfg. Co., Chicago, Ill.
• McDonnell & Miller, Inc., Chicago, Ill.
• Mercoid Corp., The, Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
Monitor Controller Co., The, Baltimore, Md.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Norgren Co., C. A., Denver, Colo.
• Powers Regulator Co., Chicago, Ill.
Republic Flow Meters Co., Chicago, Ill.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Square D Co., Detroit, Mich.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Staples & Pfeiffer, San Francisco, Calif.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong, Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., Cleveland, O.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Tryco Products, Inc., Westfield, Mass.
United Electric Controls Co., Boston, Mass.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Wheelco Instruments Co., Chicago, Ill.
• White-Rodgers Electric Co., St. Louis, Mo.
Williams Gauge Co., Pittsburgh, Pa. (Feed water)

REGULATORS, STATIC PRESSURE, AIR DUCT

• Barber-Colman Co., Rockford, Ill.
Bristol Co., Waterbury, Conn.
• Cash Co., A. W., Decatur, Ill.
• Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland, O.
• Johnson Service Co., Milwaukee, Wis.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Powers Regulator Co., Chicago, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.

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REGULATORS, TEMPERATURE

American Instrument Co., Silver Spring, Md.
American Schaeffer & Budenberg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Armstrong Heat Control Co., Portland, Ore.
Atlas Valve Co., Inc., Newark, N. J.
• Autempco Corp., New York, N. Y.
• Automatic Products Co., Milwaukee, Wis.
• Barber-Colman Co., Rockford, Ill.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Burling Instrument Co., Newark, N. J.
• Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Crown Controls Co., New Breman, O.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
• Detroit Lubricator Co., Detroit, Mich.
• Douglass Automatic Controls Co., South Gate, Calif.
• Dunham Co., C. A., Chicago, Ill.
Eastern Engineering Co., New Haven, Conn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
• Electrimatic, Chicago, Ill.
Foster Engineering Co., Newark, N. J.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
• Fulton Syphon Co., Knoxville, Tenn.
• General Controls Co., Glendale, Calif.
Gleason-Avery, Inc., Auburn, N. Y.
H-B Instrument Co., Philadelphia, Pa.
• Hagan Corp., Pittsburgh, Pa.
Hart Mfg. Co., The, Hartford, Conn.
• Hays Corp., Michigan City, Ind.
Heat Timer Corp., New York, N. Y.
• Illinois Engineering Co., Chicago, Ill.
• Johnson Service Co., Milwaukee, Wis.
Keckley Co., O. C., Chicago, Ill.
Klipfel Mfg. Co., Chicago, Ill.
Lawler Automatic Controls, Mount Vernon, N. Y.
• Leeds & Northrup Co., Philadelphia, Pa.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Marsh Corp., Jas. P., Chicago, Ill.
Marsh Heating Equipment Co., Chicago, Ill.
Master Electric Co., Aircraft & Electrical Controls Div., Dayton, O.
• McAlear Mfg. Co., Chicago, Ill.
McCorkle Co., D. H., Berkeley, Calif.
• Mercoid Corp., Chicago, Ill.
Miller Heat-O-Meter Co., Milwaukee, Wis.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
• Powers Regulator Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Pyrometer Instrument Co., New York, N. Y.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Spence Engineering Co., Inc., Walden, N. Y.
Spencer Thermostat Co., Attleboro, Mass.
Square D Co., Detroit, Mich.
• Sterling, Inc., Milwaukee, Wis.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Peru, Ind.
United Electric Controls Co., Boston, Mass.
Vapor Car Heating Co., Inc., Chicago, Ill.
Watson & McDaniel Co., Philadelphia, Pa.
Wheelco Instruments Co., Chicago, Ill.
White Mfg. Co., St. Paul, Minn.
• White-Rodgers Electric Co., St. Louis, Mo.

RELAYS, ELECTRICAL

Advance Electric and Relay Co., Los Angeles, Calif.
Allen-Bradley Co., Milwaukee, Wis.
• American Gas Accumulator Co., Elizabeth, N. J.
American Instrument Co., Silver Spring, Md.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
• Autempco Corp., New York, N. Y.
Automatic Switch Co., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
B/W Controller Corp., Birmingham, Mich.
• Barber-Colman Co., Rockford, Ill.
Bardco Mfg. & Sales Co., Los Angeles, Calif.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Clark Controller Co., Cleveland, O.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
• Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cramer Co., Inc., R. W., The, Centerbrook, Conn.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis & Co., Inc., Dean W., Kentland, Ind.
• Detroit Lubricator Co., Detroit, Mich.
Dunn, Inc., Struthers, Philadelphia, Pa.
Durakool, Inc., Elkhart, Ind.
Electro-Switch & Controls Co., Los Angeles, Calif.
Edison, Inc., Thos. A., Instrument Div., West Orange, N. J.
Electro-Switch & Controls Co., Los Angeles, Calif.
Ess Instrument Co., Fort Lee, N. J.
• General Controls Co., Glendale, Calif.
General Electric Co., Schenectady, N. Y.
Gleason-Avery, Inc., Auburn, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
H-B Instrument Co., Philadelphia, Pa.
Hart Mfg. Co., Hartford, Conn.
Industrial Engineering Corp., Terre Haute, Ind.
Leach Relay Co., Los Angeles, Calif.
McCorkle Co., D. H., Berkeley, Calif.
• Mercoid Corp., Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The, Baltimore, Md.
National Time & Signal Corp., Detroit, Mich.
• Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Reynolds Electric Co., Chicago, Ill.
Rhodes, Inc., M. H., Hartford, Conn. (time delay)
Sampsel Time Control, Inc., Spring Valley, Ill.
Small Motors, Inc., Chicago, Ill.
Spencer Thermostat Co., Attleboro, Mass.
Square D Co., Milwaukee, Wis.
Struthers Dunn, Inc., Philadelphia, Pa.
Synchro-Start Products, Chicago, Ill.
• Taylor Instrument Companies, Rochester, N. Y.
• Thrush & Co., H. A., Peru, Ind.
Tork Clock Co., Inc., Mt. Vernon, N. Y.
Triplex Heating Specialty Co., Peru, Ind.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
Westinghouse Electric Corp., East Pittsburgh, Pa.
Weston Electrical Instrument Corp., Newark, N. J.
Zenith Electric Co., Chicago, Ill.

RELIEF VALVES

See Valves, Relief

REPAIR CLAMPS

See Clamps, Pipe Repair

REPAIR PLUGS FOR TANKS

See Plugs, Repair, for Tanks

RESEATERS, VALVE

Chicago Specialty Mfg. Co., Chicago, Ill.
Economy Valve Seat Co., Chicago, Ill.
Leavitt Machine Co., Orange, Mass.
Standard Reseater Corp., New York, N. Y.

RINGS, PISTON, FOR COMPRESSORS

American Hammered Piston Ring Div., Koppers Co., Baltimore, Md.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Perfect Circle Co., The, Hagerstown, Ind.
Perfection Refrigeration Parts Co., Harvey, Ill.
Sealed Power Corp., Muskegon, Mich.

RINGS, WELDING

Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.
• Tube Turns, Inc., Louisville, Ky.
Wedge Protectors, Inc., Cleveland, O.

ROD, GAS WELDING

• Air Reduction Sales Co., New York, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
• American Brass Co., Waterbury, Conn.
American Steel & Wire Co., Cleveland, O.
Atlantic Steel Co., Atlanta, Ga.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Steel & Wire Co., Chicago, Ill.
Crucible Steel Co. of America, New York, N. Y.
Dow Chemical Co., The, Midland, Mich.
Duraloy Co., Scottdale, Pa. (Stainless)
Eutectic Welding Alloys Co., New York, N. Y.
International Nickel Co., New York, N. Y.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Marquette Mfg. Co., Minneapolis, Minn.
Maurath, Inc., Cleveland, O.
Milburn Co., Alexander, Baltimore, Md.
Mir-O-Col Alloy Co., Los Angeles, Calif.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Page Steel & Wire Division of American Chain & Cable Co., Inc., Monessen, Pa.
• Revere Copper and Brass, Incorporated, New York, N. Y.
Torchweld Equipment Div., National Cylinder Gas Co., Chicago, Ill.
Universal Power Corp., Cleveland, O.
Victor Equipment Co., San Francisco, Calif.
Wickwire Spencer Steel Div. of Colorado Fuel & Iron Corp., New York, N. Y.
• Youngstown Sheet & Tube Co., Youngstown, O.

ROLLER BEARINGS

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ROOF COOLERS

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ROOF SPRAYING SYSTEMS

See Systems, Roof Spraying

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ROOF VENTILATORS
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ROOM HUMIDIFIERS
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ROOM THERMOSTATS
See Thermostats, Room or Wall

ROTARY PUMPS
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RUBBER BELTING
See Belting, Flat, Rubber

RUBBER PACKING
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RUBBER PIPE
See Pipe, Hard Rubber

SADDLE VALVES
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SAFETY VALVES
See Valves, Safety, Steam

SCREENS, SUN REFLECTING
• Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Kane Mfg. Corp., Kane, Pa.
Yardley Industries, Columbus, O.

SEALS, SHAFT, MECHANICAL
Crane Packing Co., Chicago, Ill.
Garlock Packing Co., Palmyra, N. Y.
Rotary Seal Co., Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.

SEAMLESS PIPE
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SEPARATORS, AIR
Adams Co., Inc., R. P., Buffalo, N. Y.
American Injector Co., Detroit, Mich.
• Bird-White Co., Chicago, Ill.
Black Mfg. Co., The, Baltimore, Md.
Bowser, Inc., Fort Wayne, Ind.
Centrifix Corp., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
DeVilbiss Co., The, Toledo, O.
• Dollinger Corp., Rochester, N. Y.
Dri-Steam Products, Inc., New York, N. Y.
Gasflux Co., Mansfield, O.
• Hagan Corp., Pittsburgh, Pa.
• Illinois Engineering Co., Chicago, Ill.
Johnson Corp., Three Rivers, Mich.
Keckley Co., O. C., Chicago, Ill.
Leavitt Machine Co., Orange, Mass.
Logan Engineering Co., Chicago, Ill.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Spencer Turbine Co., Hartford, Conn.
Spray Engineering Co., Somerville, Mass.
Straight Line Foundry & Machine Corp., Direct Separator Div., The, Syracuse, N. Y.
Strong, Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., Cleveland, O.
Textite Corp., Chicago, Ill.
Trerice Co., H. O., Detroit, Mich.
Wright-Austin Co., Detroit, Mich.

SEPARATORS, STEAM AND OIL
• Acme Industries, Inc., Jackson, Mich.
Adams Co., Inc., R. P., Buffalo, N. Y.
• American District Steam Co., North Tonawanda, N. Y.
Boylston Steam Specialty Co., Chicago, Ill.
Centrifix Corp., Cleveland, O. (Gas and vapor)
Cochrane Corp., Philadelphia, Pa.
• Crane Co., Chicago, Ill.
Dri-Steam Products, Inc., New York, N. Y.
Elliott Co., Jeannette, Pa.
• Fisher Governor Co., Marshalltown, Ia.
Flotrol Systems, Inc., New York, N. Y.
Frick Co., Waynesboro, Pa.
• Hagan Corp., Pittsburgh, Pa.
Hoppes Mfg. Co., Springfield, O.
• Illinois Engineering Co., Chicago, Ill.
• Johnson Corp., Three Rivers, Mich.
• Kieley & Mueller, Inc., North Bergen, N. J.
Kisco Boiler & Engineering Co., St. Louis, Mo.
• McAlear Mfg. Co., Chicago, Ill.
Morehead Mfg. Co., Detroit, Mich.
National Valve & Mfg. Co., Pittsburgh, Pa.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Schutte & Koerting Co., Philadelphia, Pa.
Sims Co., Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
Straight Line Foundry & Machine Corp., Direct Separator Div., The, Syracuse, N. Y.
Strong, Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., Cleveland, O.
Temprite Products Corp., Detroit, Mich.
Textite Corp., Chicago, Ill.
• Webster & Co., Warren, Camden, N. J.
Westfalia Separator Co., Bloomfield, N. J.
• Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
Wright-Austin Co., Detroit, Mich.

SEWAGE EJECTORS
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SEWAGE PUMPS
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SHAFT SEALS, MECHANICAL
See Seals, Shaft, Mechanical

SHAFTS, FLEXIBLE, PUSH-PULL, FOR CONTROL
Arens Controls, Inc., Chicago, Ill.

SHEARS, ELECTRIC, PORTABLE
• Black & Decker Mfg. Co., Towson, Md.
C-B Tool Co., Lancaster, Pa.
G. D. S. Machinery & Supply Co., Inc., New York, N. Y.
Independent Pneumatic Tool Co., Chicago, Ill.
O'Neil Irwin Mfg. Co., Minneapolis, Minn.
Skilsaw, Inc., Chicago, Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Van Dorn Electric Tool Co., Towson, Md.
York Electric & Machine Co., York, Pa.

SHEARS, POWER
Beatty Machine & Mfg. Co., Hammond, Ind.
Bertsch & Co., Inc., Cambridge City, Ind.
Bliss Co., E. W., Toledo, O.
Buckeye Tools Corp., Dayton, O.
• Buffalo Forge Co., Buffalo, N. Y.
Cincinnati Shaper Co., Cincinnati, O.
Cleveland Punch & Shear Works Co., Cleveland, O.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore, Beloit, Wis.
Marshalltown Mfg. Co., Marshalltown, Ia.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Minneapolis, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Div., Whiting Corp., Harvey, Ill.
Rafter Machine Co., Belleville, N. J.
St. Louis Tool Co., St. Louis, Mo.
Whitney Metal Tool Co., Rockford, Ill.
Yoder Co., The, Cleveland, O.

SHEARS AND SNIPS, HAND
Armstrong-Blum Mfg. Co., Chicago, Ill.
Bartlett Mfg. Co., Detroit, Mich.
Beverly Throatless Shear Co., Chicago, Ill.
Bremil Mfg. Co., Erie, Pa.
Clauss Shear Co., Fremont, O.
Crescent Tool Co., Jamestown, N. Y.
Excelsior Tool & Machine Co., East St. Louis, Ill.
G. D. S. Machine & Supply Co., Inc., New York, N. Y.
Grobet File Corp. of America, New York, N. Y.
Hendley & Whittemore, Beloit, Wis.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt. (Angle)
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Minneapolis, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
Rafter Machine Co., Belleville, N. J.
Snap-On Tools Corp., Kenosha, Wis.
Viking Shear Co., Erie, Pa.
Whitney Metal Tool Co., Rockford, Ill.
Wiss & Sons Co., J., Newark, N. J.

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SHEET METAL DUCTS
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SHEET METAL FITTINGS
See Ducts and Duct Fittings, Prefabricated

SHEET METAL PUNCHES
See Punches, Sheet Metal

SHEETS, ALUMINUM
• Aluminum Co. of America, Pittsburgh, Pa.
American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
Fairmont Aluminum Co., Fairmont, W. Va.
Reynolds Metals Co., Richmond, Va.

SHEETS, ALUMINUM COATED
• American Rolling Mill Co., The, Middletown, O.

SHEETS AND BOARD, NON-METALLIC, FOR DUCT CONSTRUCTION
Carey Mfg. Co., Philip, Cincinnati, O.
Celotex Corp., The, Chicago, Ill.
• Grant Wilson, Inc., Chicago, Ill.
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Keystone Asphalt Products Co., Chicago, Ill.
Masonite Corp., Chicago, Ill.
Ruberoid Co., New York, N. Y.
Sail Mountain Co., Chicago, Ill.

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Technical Ply-Woods, Chicago, Ill.
United States Gypsum Co., Chicago, Ill.
• Wilson, Inc., Grant, Chicago, Ill.

SHEETS, CLAD

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
• Aluminum Co. of America, Pittsburgh, Pa.
American Nickeloid Co., Peru, Ill.
• American Rolling Mill Co., The, Middletown, O.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Follansbee Steel Corp., Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill. (Stainless)
• Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Lamb & Ritchie Co., Cambridge, Mass.
Lukens Steel Co., Coatsville, Pa.

SHEETS, COPPER

• American Brass Co., Waterbury, Conn.
American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Downs-Smith Brass & Copper Co., New York, N. Y.
Hussey & Co., C. G., Pittsburgh, Pa.
New Haven Copper Co., Seymour, Conn.
• Revere Copper and Brass, Incorporated, New York, N. Y.
United States Brass & Copper Co., Hyde Park, Boston, Mass.
• Weirton Steel Co., Weirton, W. Va.
Western Brass Mill Div., Olin Industries, Inc., East Alton, Ill. (Brass, bronze, phosphor bronze)

SHEETS, LEAD

Alpha Metals, Inc., Brooklyn, N. Y.
American Smelting & Refining Co., New York, N. Y.
Belmont Smelting & Refining Wks., Inc., Brooklyn, N. Y.
Continental Steel Corp., Kokomo, Ind. (Coated)
Downs-Smith Brass & Copper Co., New York, N. Y.
Eagle-Picher Co., Cincinnati, O.
Flemm Lead Co., Inc., Long Island City, N. Y.
Illinois Zinc Co., Chicago, Ill.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Rochester Lead Wks., Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
• Weirton Steel Co., Weirton, W. Va. (Alloy coated)

SHEETS, MAGNESIUM ALLOY

• Dow Chemical Co., The, Midland, Mich.
• Revere Copper and Brass, Incorporated, New York, N. Y.

SHEETS, METAL, WITH PROTECTIVE NON-METALLIC COATING

American Steel Band Co., Pittsburgh, Pa.
Cheney Metal Products Co., Trenton, N. J.
Protected Steel Products Co., Washington, Pa.
Technical Ply-Woods, Chicago, Ill. (Metal and plywood)

SHEETS, NICKEL AND NICKEL ALLOY

American Nickeloid Co., Peru, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
International Nickel Co., New York, N. Y.
Koppers Co., Bartlett Hayward Div., Baltimore, Md.
• Revere Copper and Brass Incorporated, New York, N. Y.
Robertson Co., H. H., Pittsburgh, Pa.
Western Brass Mill Div., Olin Industries, Inc., East Alton, Ill.

SHEETS, STEEL, COPPER BEARING

• American Rolling Mill Co., The, Middletown, O.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
• Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Columbia Steel Co. (Sub. United States Steel Corp.), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Follansbee Steel Corp., Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Newport Rolling Mill Co., Div. of The Andrews Steel Co., Newport, Ky.
Penn Galvanizing Co., Philadelphia, Pa.
Reeves Steel & Mfg. Co., Dover, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
Superior Sheet Steel Co., The, Canton, O.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
• Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
• Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, STEEL, GALVANIZED

• American Rolling Mill Co., The, Middletown, O.
American Steel & Wire Co., Cleveland, O.
Apollo Steel Co., Apollo, Pa.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
• Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Columbia Steel Co. (Sub. United States Steel Corp.), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, New York, N. Y.
Empire Sheet & Tin Plate Co., Mansfield, O.
Follansbee Steel Corp., Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Detroit, Mich.
Inland Steel Co., Chicago, Ill.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Newport Rolling Mill Co., Div. of The Andrews Steel Co., Newport, Ky.
Niles Rolling Mill Co., Niles, O.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Penn Galvanizing Co., Philadelphia, Pa.
Reeves Steel & Mfg. Co., Dover, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
Superior Sheet Steel Co., The, Canton, O.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
• Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wood Steel Co., Alan, Conshohocken, Pa.

SHEETS, STEEL, GALVANNEALED

• American Rolling Mill Co., The, Middletown, O.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Continental Steel Corp., Kokomo, Ind.
Newport Rolling Mill Co., Div. of The Andrews Steel Co., Newport, Ky.
Penn Galvanizing Co., Philadelphia, Pa.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
Superior Sheet Steel Co., The, Div. of Continental Steel Corp., Canton, O.

SHEETS, STEEL, STAINLESS

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
• American Rolling Mill Co., The, Middletown, O.
Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Crucible Steel Co. of America, New York, N. Y.
Eastern Stainless Steel Corp., Baltimore, Md.
• Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
Superior Steel Corp., Pittsburgh, Pa.
Universal-Cyclops Steel Corp., Bridgeville, Pa.
Washington Steel Corp., Washington, Pa.

SHEETS, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.

SHEETS, ZINC

American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
American Zinc Products Co., Greencastle, Ind.
Belmont Smelting & Refining Wks., Inc., Brooklyn, N. Y.
Downs-Smith Brass & Copper Co., New York, N. Y.
Hegeler Zinc Co., Danville, Ill.
Illinois Zinc Co., Chicago, Ill.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
New Jersey Zinc Sales Co., New York, N. Y.

SHUTTERS

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SIGHT GLASSES

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SLIME AND ALGAE CONTROL, WATER TREATMENT FOR

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SMOKE ALARMS

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SMOKE GUNS

See Guns and Pots, Smoke and Smudge

SMUDGE POTS

See Guns and Pots, Smoke and Smudge

SOCKET WRENCHES

See Wrenches, Socket

SOFTENERS, WATER

American Water Softener Co., Philadelphia, Pa.
Elgin Softener Corp., Elgin, Ill.
Cochrane Corp., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Red Jacket Mfg. Co., Davenport, Ia.
Uniflow Mfg. Co., Erie, Pa.
Warlo Corp., New York, N. Y.

SOLAR HEAT RESISTING SCREENS

See Screens, Sun reflecting

SOLDER (SILVER), BRAZING ALLOYS, AND FLUXES

• Air Reduction Sales Co., New York, N. Y.
American Smelting & Refining Co., New York, N. Y.
Atkins & Co., E. C., Indianapolis, Ind.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.

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Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Eutectic Welding Alloys Co., New York, N. Y.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
• Handy & Harman, New York, N. Y.
Hardy, Inc., Charles, New York, N. Y.
Industrial Service Laboratories, Milwaukee, Wis.
Johnson Co., Lloyd S., Chicago, Ill.
Special Chemicals Co., New York, N. Y.

SOLDER (TIN-LEAD), AND FLUXES

• Air Reduction Sales Co., New York, N. Y.
Alpha Metals, Inc., Brooklyn, N. Y.
• American Brass Co., Waterbury, Conn.
American Smelting & Refining Co., New York, N. Y.
American Solder & Flux Co., Philadelphia, Pa.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Benson Co., Inc., Alex R., Hudson, N. Y.
Burnley Battery & Mfg. Co., North East, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Downs-Smith Brass & Copper Co., New York, N. Y.
Eagle-Picher Co., Cincinnati, O.
Flemm Lead Co., Inc., Long Island City, N. Y.
Gardiner Metal Co., Chicago, Ill.
Glaser Lead Co., Inc., Brooklyn, N. Y.
Hercules Chemical Co., Inc., New York, N. Y.
Industrial Service Laboratories, Milwaukee, Wis.
Johnson Co., Lloyd S., Chicago, Ill.
Johnston Tin Foil & Metal Co., The, St. Louis, Mo.
Kester Solder Co., Chicago, Ill.
Klauer Mfg. Co., Dubuque, Ia.
Lewis Laboratories, Inc., Paul, Milwaukee, Wis.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
Merchant & Evans Co., Philadelphia, Pa.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Rochester Lead Works, Inc., Rochester, N. Y.
Ruby Chemical Co., Columbus, O.
Torchweld Equipment Div., National Cylinder Gas Co., Chicago, Ill.
Utility Laboratory, Inc., Brooklyn, N. Y.
Wolfe-Kote Co., Sheboygan, Wis.

SOLENOIDS AND SOLENOID COILS

Allen-Bradley Co., Milwaukee, Wis.
• Cook Electric Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis & Co., Inc., Dean W., Kentland, Ind.
Division of Essex Wire Corp., Detroit, Mich.
Electric Controller & Mfg. Co., Cleveland, O.
General Electric Co., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Jefferson Electric Co., Bellwood, Ill.
National Acme Co., The, Cleveland, O.
R-B-M Mfg. Co., Hanna St., Logansport, Ind.
Soreng Manegold Co., Chicago, Ill.
Trombetta Solenoid Co., Milwaukee, Wis.
• West Coast Electrical Mfg. Co., Los Angeles, Calif.

SOLENOID VALVES

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See Blowers, Soot

SOOT DESTROYERS

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SOUND DEADENING FOR CEILING AND WALL

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SOUND DEADENING FOR DUCTS

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SOUND INDICATORS

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SPEED REDUCERS

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SPOT WELDERS

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STAINLESS STEEL PIPE

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STAINLESS STEEL SHEETS

See Sheets, Steel, Stainless

STANDS, PIPE VISE

American Pipe Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Crown Die & Tool Co., Chicago, Ill.
Martin & Sons, H. P., Owensboro, Ky.
Nye Tool & Machine Co., Chicago, Ill.
• Ridge Tool Co., Elyria, O.
Toledo Pipe Threading Machine Co., Toledo, O.
Western Wire Products Co., St. Louis, Mo.
Williams & Co., J. H., Buffalo, N. Y.

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STERILIZING UNITS

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STOCKS AND DIES

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Champion Blower & Forge Co., Lancaster, Pa.
Crown Die & Tool Co., Chicago, Ill. (Pipe)
Erie Tool Wks., Erie, Pa.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hollands Mfg. Co., Erie, Pa.
Nye Tool & Machine Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
• Ridge Tool Co., Elyria, O.
Toledo Pipe Threading Machine Co., Toledo, O.

STOKERS, INDUSTRIAL AND COMMERCIAL

61 to 1200 Lb per Hr

Allen Stoker Co., Allentown, Pa.
American Coal Burner Co., Chicago, Ill.
American Engineering Co., Philadelphia, Pa.
Anchor Stove & Range Co., New Albany, Ind.
Auburn Burner Co., Auburn, Ind.
Auburn Foundry, Inc., Stoker Div., Auburn, Ind.
Babcock & Wilcox Co., New York, N. Y.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Brownell Co., Dayton, O.
Burke Stoker & Mfg. Co., Chicago, Ill.
Burnham Stoker Co., Vancouver, Wash.
Canton Stoker Corp., Canton, O.
Carnes, Inc., John R., Lima, O.
Catskill Metal Works, Inc., Catskill, N. Y.
Central Rubber & Steel Corp., Findlay, O.
Chesapeake & Ohio R. R. Co., Cleveland, O.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Combustion Engineering Co., Inc., New York, N. Y.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Cooper & Cooper, Pittsfield, Mass.
• Crown Iron Works Co., Minneapolis, Minn.
Detroit Stoker Co., Detroit, Mich.
Econocol Stoker Div. of Cotta Transmission Co., Rockford, Ill.
Eddy Stoker Corp., Chicago, Ill.
Fairbanks, Morse & Co., Chicago, Ill.
Firemood Machine Wks., Converse, Ind.
Flynn & Emrich Co., Baltimore, Md.
• Freeman Stoker Div., Illinois Iron & Bolt Co., Chicago, Ill.
Fuel Savers, Inc., Harrisburg, Pa.
• Gehl Bros. Mfg. Co., West Bend, Wis.
General Machinery Co., Spokane, Wash.

Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Heating Assurance, Inc., Spokane, Wash.
Her-Born Engrg. & Mfg. Co., Sandusky, O.
Hershey Machine & Foundry Co., Motorstoker Div., Manheim, Pa.
Holcomb & Coke Mfg. Co., Indianapolis, Ind.
International Engineering Wks., Inc., Framingham, Mass.
Iron Fireman Mfg. Co., Cleveland, O.
Johnston & Jennings Co., Cleveland, O.
Kingston Products Corp., Kokomo, Ind.
Kol-Master Corp., Oregon, Ill.
Laclede Stoker Co., St. Louis, Mo.
Leffel & Co., Springfield, O.
Link-Belt Co., Chicago, Ill.
"Loyal Knight" Stokers, Inc., Belleville, Ill.
Mallory Sales Co., Dolton, Ill.
Meyer Furnace Co., The, Peoria, Ill.
Muncie Gear Wks., Inc., Muncie, Ind.
National Steam Pump Co., Upper Sandusky, O.
Neemes Foundry, Inc., Troy, N. Y.
Northern Steel & Stoker Corp., Peoria, Ill.
Ormsby-Osterman, Inc., St. Louis, Mo.
OverSpred Stoker Co., Chicago, Ill.
• Peerless Mfg. Corp., Louisville, Ky.
Perfection Grate & Stoker Co., Springfield, Mass.
Plymouth Industries, Inc., Plymouth, Ind.
Pocahontas Fuel Co., Inc., Stoker Div., Cleveland, O.
Riddell, Inc., W. A., Frederick, Md.
Riley Stoker Corp., Worcester, Mass.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Scott-Newcomb, Inc., St. Louis, Mo.
Sinker-Davis Co., Indianapolis, Ind.
Steel Products Engineering Co., Springfield, O.
Stok-A-Fire Co., University City, Mo.
Stokermatic Div., Rheem Mfg. Co., Salt Lake City, Utah.
Sun-Fire Stoker Corp., New Albany, Ind.
Thermal Engineering Co., Chicago, Ill.
U. S. Machine Corp., Lebanon, Ind.
Westinghouse Electric Corp., East Pittsburgh, Pa.
Whiting Stoker Sales Co., Chicago, Ill.
Whitty Co., Inc., Boston, Mass.
Will-Burt Co., The, Orrville, O.

STONEWARE PIPE

See Pipe, Stoneware

STORAGE WATER HEATERS

See Heaters, Water, Steam, Storage

STRAINERS, PIPE LINE

• Alco Valve Co., St. Louis, Mo.
Alten's Foundry & Machine Works, Lancaster, O.
• American District Steam Co., North Tonawanda, N. Y.
American Injector Co., Detroit, Mich.
Andale Co., Philadelphia, Pa.
• Anderson Co., V. D., The, Cleveland, O.
Barrett, Haentjens & Co., Hazleton, Pa.
• Bishop & Babcock Mfg. Co., Cleveland, O.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blackmer Pump Co., Grand Rapids, Mich.
Bowser, Inc., Fort Wayne, Ind.
Boylston Steam Specialty Co., Chicago, Ill.
• Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Cashin Co., W. D., Boston, Mass.
Clark Mfg. Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Cuno Engineering Corp., Meriden, Conn.
Davis Regulator Co., Chicago, Ill.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
Dri-Steam Products, Inc., New York, N. Y.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Edward Valve & Mfg. Co., Inc., East Chicago, Ind.
Elliott Co., Jeannette, Pa.
• Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Foster Pump Works, Inc., Brooklyn, N. Y.
• General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
• Henry Valve Co., Chicago, Ill.
• Hoffman Specialty Co., Indianapolis, Ind.
Hubbell Corp., Chicago, Ill.
• Illinois Engineering Co., Chicago, Ill.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
• Kieley & Mueller, Inc., North Bergen, N. J.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Leslie Co., Lyndhurst, N. J.
• Mald-O'-Mist, Inc., Chicago, Ill.
Manufacturers Fin Coil Co., Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
• McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
• Mueller Brass Co., Port Huron, Mich.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Long Island City, N. Y.
Newark Wire Cloth Co., Newark, N. J.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
• Phillips & Co., H. A., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
• Sarco Co., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte & Koerting Co., Philadelpia, Pa.
Scientific Instrument Co., Detroit, Mich.
Sheffler-Gross Co., Philadelphia, Pa.
Spence Engineering Co., Walden, N. Y.
Spray Engineering Co., Somerville, Mass.
• Spraying Systems Co., Chicago, Ill.
Staples & Pfeiffer, San Francisco, Calif.
• Sterling, Inc., Milwaukee, Wis.
Strong, Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., Cleveland, O.
• Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Trimount Rotary Power Co., East Dedham, Mass.
Tryco Products, Inc., Westfield, Mass.
Wade Mfg. Co., Elgin, Ill.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
• Webster & Co., Warren, Camden, N. J.
Webster Electric Co., Racine, Wis. (For oil burners)
Winslow Engineering Co., Oakland, Calif.
Wright-Austin Co., Detroit, Mich.
• Yarnall-Waring Co., Philadelphia, Pa.
Zallea Brothers & Johnson, Wilmington, Del.

STRESS RELIEVERS

See Preheaters and Stress Relievers, Electric, for Pipe Welds

STRIP HEATERS

See Heaters, Strip and Immersion, Electric

STRUCTURAL SHAPES

See Angles, Bars, Beams, Channels and Tees

STUD WELDERS

See Welders, Stud

SUCTION LINE HEAT EXCHANGERS

See Exchangers, Heat, Refrigerant Suction Line

SUMP PUMPS

See Pumps, Sump

SUPERHEATERS, PROCESS STEAM

• Bell & Gossett Co., Morton Grove, Ill.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Combustion Engineering Co., Inc., New York, N. Y.
Edge Moor Iron Works, Inc., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
Selas Corp. of America, Philadelphia, Pa.

SURFACE, FINNED, COOLING, BRINE

• Acme Industries, Inc., Jackson, Mich.
Aerofin Corp., Syracuse, N. Y.
Beacon-Morris Corp., Boston, Mass.
Betz Corp., Hammond, Ind.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
• Bush Mfg. Co., Hartford, Conn.
Conditionaire Unit Co., Chicago, Ill.
Drayer & Hanson, Inc., Los Angeles, Calif.
G. & O. Mfg. Co., New Haven, Conn.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Griscom-Russell Co., The, New York, N. Y.
• Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
• Mario Coil Co., St. Louis, Mo.
• McCord Corp., Detroit, Mich.
• McQuay, Inc., Minneapolis, Minn.
• Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
• Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rempe Co., Chicago, Ill.
Roessing Mfg. Co., Pittsburgh, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
Super Radiator Corp., Minneapolis, Minn.
• Tenney Engineering, Inc., Newark, N. J.
• Trane Co., The, La Crosse, Wis.
Vilter Mfg. Co., Milwaukee, Wis.
Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
• Young Radiator Co., Racine, Wis.

SURFACE, FINNED, COOLING, COLD WATER

• Acme Industries, Inc., Jackson, Mich.
Aerofin Corp., Syracuse, N. Y.
• Airtemp, Div. of Chrysler Corp., Dayton, O.
Beacon-Morris Corp., Boston, Mass.
Betz Corp., Hammond, Ind.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
• Bush Mfg. Co., Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.

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Conditionaire Unit Co., Chicago, Ill.
Drayer & Hanson, Inc., Los Angeles, Calif.
• Extended Surface Div. of David E. Kennedy, Inc., Brooklyn, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
G. & O. Mfg. Co., New Haven, Conn.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit Wis.
Griscom-Russell Co., The, New York, N. Y.
• Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
• Johnson Fan & Blower Corp., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
• Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
Manufacturers Fin Coil Co., Chicago, Ill.
• Marlo Coil Co., St. Louis, Mo.
• McCord Corp., Detroit, Mich.
• McQuay, Inc., Minneapolis, Minn.
• Modine Mfg. Co., Racine, Wis.
• Murray Mfg. Co., D. J., Wausau, Wis.
• Nesbitt, Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York, N. Y.
Palmer Mfg. Corp., Phoenix, Ariz.
• Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rempe Co., Chicago, Ill.
Roessing Mfg. Co., Pittsburgh, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Standard Galvanizing Co., Chicago Ill.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
Super Radiator Corp., Minneapolis, Minn.
• Tenney Engineering, Inc., Newark, N. J.
• Trane Co., The, La Crosse, Wis.
• United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Springfield, Mass.
• Wing Mfg. Co., L. J., New York, N. Y.
X L Refrigerating Co., Chicago, Ill.
Yates-American Machine Co., Beloit, Wis.
York Corp., York, Pa.
• Young Radiator Co., Racine, Wis.

SURFACE, FINNED, COOLING, DIRECT EXPANSION

• Acme Industries, Inc., Jackson, Mich.
Aerofin Corp., Syracuse, N. Y.
• Airtemp Div. of Chrysler Corp., Dayton, O.
Beacon-Morris Corp., Boston, Mass.
Betz Corp., Hammond, Ind.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
• Bush Mfg. Co., Hartford Conn.
Conditionaire Unit Co., Chicago, Ill.
Drayer & Hanson, Inc., Los Angeles, Calif.
• Extended Surface Div. of David E. Kennedy, Inc., Brooklyn, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
G. & O. Mfg. Co., New Haven, Conn.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Griscom-Russell Co., The, New York, N. Y.
• Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
Kauffman Air Conditioning Corp., St. Louis, Mo.
• Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
Manufacturers Fin Coil Co., Chicago, Ill.
• Marlo Coil Co., St. Louis, Mo.
• McCord Corp., Detroit, Mich.
• McQuay, Inc., Minneapolis, Minn.
• Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
• Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rempe Co., Chicago, Ill.
Roessing Mfg. Co., Pittsburgh, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Standard Galvanizing Co., Chicago, Ill.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
Super Radiator Corp., Minneapolis, Minn.
• Tenney Engineering, Inc., Newark, N. J.
• Trane Co., The, La Crosse, Wis.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Springfield, Mass.
Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.
X L Refrigerating Co., Chicago, Ill.
Yates-American Machine Co., Beloit, Wis.
York Corp., York, Pa.
• Young Radiator Co., Racine, Wis.

SURFACE, FINNED, HEATING, INDIRECT, FERROUS

Bayley Blower Co., Milwaukee, Wis.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Campbell Heating Co., E. K., Kansas City, Mo.
Conditionaire Unit Co., Chicago, Ill.
Drayer & Hanson, Inc., Los Angeles, Calif.
G. & O. Mfg. Co., New Haven, Conn.
Griscom-Russell Co., The, New York, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Manufacturers Fin Coil Co., Chicago, Ill.
• Modine Mfg. Co., Racine, Wis.
• Murray Mfg. Co., D. J., Wausau, Wis.
New York Blower Co., Chicago, Ill.
Niagara Blower Co., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
• Tenney Engineering, Inc., Newark, N. J.
Westinghouse Electric Corp., Springfield, Mass.
Wolff & Munier, Inc., New York, N. Y. (For panel heating)

SURFACE, FINNED, HEATING, INDIRECT, NON-FERROUS

Aerofin Corp., Syracuse, N. Y.
• Airtherm Mfg. Co., St. Louis, Mo.
Bayley Blower Co., Milwaukee, Wis.
Beacon-Morris Corp., Boston, Mass.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
• Bush Mfg. Co., Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.
Drayer & Hanson, Inc., Los Angeles, Calif.
• Extended Surface Div. of David E. Kennedy, Inc., Brooklyn, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
G. & O. Mfg. Co., New Haven, Conn.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Griscom-Russell Co., The, New York, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
• Johnson Fan & Blower Corp., Chicago, Ill.
• Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
Kauffman Air Conditioning Corp., St. Louis, Mo.
• Kennard Corp., St. Louis, Mo.
• Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
Manufacturers Fin Coil Co., Chicago, Ill.
• Marlo Coil Co., St. Louis, Mo.
• McCord Corp., Detroit, Mich.
• McQuay, Inc., Minneapolis, Minn.
• Modine Mfg. Co., Racine, Wis.
• Murray Mfg. Co., D. J., Wausau, Wis.
• Nesbitt, Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York, N. Y.
• Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rempe Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
Super Radiator Corp., Minneapolis, Minn.
• Tenney Engineering, Inc., Newark, N. J.
• Trane Co., The, La Crosse, Wis.
• United States Air Conditioning Corp., Minneapolis, Minn.
• Wing Mfg. Co., L. J., New York, N. Y.
Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.
York Corp., York, Pa.
• Young Radiator Co., Racine, Wis.

SURFACE THERMOSTATS

See Thermostats, Surface

SWING JOINTS

See Joints, Pipe, Flexible Swing and Revolving

SWITCHES, ELECTRICAL

• Aerotec Co., White Plains, N. Y.
Acro Electric Co., Cleveland, O.
Adam Electric Co., Frank, St. Louis, Mo.
Allen-Bradley Co., Milwaukee, Wis.
• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Automatic Switch Co., New York, N. Y.
• Barber-Colman Co., Rockford, Ill.
Clark Controller Co., Cleveland, O.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Delta-Star Electric Co., Chicago, Ill.
Dunn, Inc., Struthers, Philadelphia, Pa.
Electric Controller & Mfg. Co., Cleveland, O.
Electric Machinery Mfg. Co., Minneapolis, Minn.
• General Controls Co., Glendale, Calif.
General Electric Co., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Hart Mfg. Co., Hartford, Conn.
Marsh Corp., Jas. P., Chicago, Ill.
Martens & Stormoen, Boston, Mass.
• McDonnell & Miller, Inc., Chicago, Ill.
• Mercoid Corp., Chicago, Ill.
Mirco Switch Div. of First Industrial Corp., Freeport, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The, Baltimore, Md.
• Penn Electric Switch Co., Goshen, Ind.
Square D Co., Detroit, Mich.
Square D Co., Industrial Controller Div., Milwaukee, Wis.

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Struthers Dunn, Inc., Philadelphia, Pa.
Tork Clock Co., Inc., Mount Vernon, N. Y.
Trumbull Electric Mfg. Co., Plainville, Conn.
Ward Leonard Electric Co., Mount Vernon, N. Y.
Westinghouse Electric Corp., East Pittsburgh, Pa.
White Mfg. Co., St. Paul, Minn.
Zenith Electric Co., Chicago, Ill.

SWITCHES, FLOAT, REFRIGERATION

• Alco Valve Co., St. Louis, Mo.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Clark Controller Co., Cleveland, O.
Frick Co., Waynesboro, Pa.
• McDonnell & Miller, Inc., Chicago, Ill.
• Mercoid Corp., The, Chicago, Ill.
• Schaub Engineering Co., Fred H., Chicago, Ill.
Square D Co., Detroit, Mich.
Ward Leonard Electric Co., Mount Vernon, N. Y.

SWITCHES, FLOW

Barton Instrument Co., Los Angeles, Calif.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Drying Systems, Inc., Chicago, Ill.
• General Controls Co., Glendale, Calif.
• McDonnell & Miller, Inc., Chicago, Ill.

SWITCHES, LIQUID LEVEL

• Alco Valve Co., St. Louis, Mo.
Allen-Bradley Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
• Automatic Control Co., St. Paul, Minn.
B/W Controller Corp., Birmingham, Mich.
Bennett Oil Co., Omaha, Neb.
Cissell Mfg. Co., W. M., Louisville, Ky.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
• Detroit Lubricator Co., Detroit, Mich.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
• General Controls Co., Glendale, Calif.
General Electric Co., Schenectady, N. Y.
Healy Ruff Co., St. Paul, Minn.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Kisco Boiler & Engineering Co., St. Louis, Mo.
• McAlear Mfg. Co., Chicago, Ill.
• McDonnell & Miller, Inc., Chicago, Ill.
• Mercoid Corp., Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The, Baltimore, Md.
• Penn Electric Switch Co., Goshen, Ind.
Photoswitch, Inc., Cambridge, Mass.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Schaub Engineering Co., Fred H., Chicago, Ill.
Square D Co., Detroit, Mich.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
• Stephens-Adamson Mfg. Co., Aurora, Ill.
Trumbull Electric Mfg. Co., Plainville, Conn.
United Cinephone Corp., Torrington, Conn.
• Ward Leonard Electric Co., Mount Vernon, N. Y.
Westinghouse Electric Corp., East Pittsburgh, Pa.

SWITCHES, MERCURY

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Durakool, Inc., Elkhart, Ind.
General Electric Co., Lamp Dept., Nela Park, Cleveland, O.
Hart Mfg. Co., Hartford, Conn.
Jefferson Electric Co., Bellwood, Ill.
• Mercoid Corp., Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

SWITCHES, PRESSURE AND VACUUM

• Aerotec Co., White Plains, N. Y.
Allen-Bradley Co., Milwaukee, Wis.
• Autempco Corp., New York, N. Y.
• Au-Temp-Co Corp., New York, N. Y.
• Barber-Colman Co., Rockford, Ill.
Clark Controller Co., Cleveland, O.
• Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
• Detroit Lubricator Co., Detroit, Mich.
General Electric Co., Schenectady, N. Y.
Giannini Co., Inc., G. M., Pasadena, Calif.
Gleason-Avery, Inc., Auburn, N. Y.
Healy Ruff Co., St. Paul, Minn.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Marsh Corp., Jas. P., Chicago, Ill.
Master Electric Co., Aircraft & Electrical Controls Div., Dayton, O.
• Mercoid Corp., Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The, Baltimore, Md.
• Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Sampsel Time Control, Inc., Spring Valley, Ill.
Spencer Thermostat Co., Attleboro, Mass.
Square D Co., Detroit, Mich.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Vapor Car Heating Co., Inc., Chicago, Ill.
Ward Leonard Electric Co., Mount Vernon, N. Y.
Westinghouse Electric Corp., East Pittsburgh, Pa.
• White-Rodgers Electric Co., St. Louis, Mo.

SWITCHES, TIME

Allen-Bradley Co., Milwaukee, Wis.
• American Gas Accumulator Co., Elizabeth, N. J.
• Autempco Corp., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
• Barber-Colman Co., Rockford, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cramer Co., Inc., R. W., The, Centerbrook, Conn.
General Electric Co., Schenectady, N. Y.
Gleason-Avery, Inc., Auburn, N. Y.
• Hansen Mfg. Co., Princeton, Ind. (timing motors and time machine)
Healy Ruff Co., St. Paul, Minn.
Heat Timer Corp., New York, N. Y.
Industrial Engineering Corp., Terre Haute, Ind.
International Register Co., Chicago, Ill.
Landis & Gyr, Inc., New York, N. Y.
Master Electric Co., Aircraft & Electrical Controls Div., Dayton, O.
• Mercoid Corp., Chicago, Ill.
Miller Heat-O-Meter Co., Milwaukee, Wis.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
National Time & Signal Corp., Detroit, Mich.
Paragon Electric Co., Chicago, Ill.
• Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Photoswitch, Inc., Cambridge, Mass.
Reliance Automatic Lighting Co., Racine, Wis.
Reynolds Electric Co., Chicago, Ill.
Rhodes, Inc., M. H., Hartford, Conn.
Sampsel Time Control, Inc., Spring Valley, Ill.
Sangamo Electric Co., Springfield, Ill.
Tork Clock Co., Inc., Mount Vernon, N. Y.
Ward Leonard Electric Co., Mount Vernon, N. Y.
Westinghouse Electric Corp., East Pittsburgh, Pa.
• White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

SYSTEMS, COMBUSTION CONTROL

Askania Regulator Co., Chicago, Ill.
Bailey Meter Co., Cleveland, O.
Bowser, Inc., Fort Wayne, Ind.
Bristol Co., Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
• Cash Co., A. W., Decatur, Ill.
Drying Systems, Inc., Chicago, Ill.
Engineer Co., New York, N. Y.
Ess Instrument Co., Fort Lee, N. J.
• Hagan Corp., Pittsburgh, Pa.
• Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland, O.
• Illinois Engineering Co., Chicago, Ill.
• Leeds & Northrup Co., Philadelphia, Pa.
• Mercoid Corp., Chicago, Ill.
National Brass Co., Grand Rapids, Mich.
Republic Flow Meters Co., Chicago, Ill.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Selas Corp. of America, Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Wheelco Instruments Co., Chicago, Ill.

SYSTEMS, HEATING, HOT WATER

• Barber-Colman Co., Rockford, Ill.
• Bell & Gossett Co., Morton Grove, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
• General Fittings Co., Providence, R. I.
Gerstein & Cooper Co., South Boston, Mass.
• Hoffman Specialty Co., Indianapolis, Ind.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Lawler Automatic Controls, Mount Vernon, N. Y.
• Maid-O'-Mist, Inc., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Sullivan Valve & Engineering Co., Butte, Mont.
Taco Heaters, Inc., New York, N. Y.
• Thrush & Co., H. A., Peru, Ind.
• Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Peru, Ind.

SYSTEMS, HEATING, VACUUM

Anderson Products, Inc., Cambridge, Mass.
Barnes & Jones, Inc., Jamaica Plain, Boston, Mass.
Cashin, W. D., Boston, Mass.
• Dunham Co., C. A., Chicago, Ill.
• Hoffman Specialty Co., Indianapolis, Ind.
• Illinois Engineering Co., Chicago, Ill.
Lord, Hawley & Hammell, Philadelphia, Pa.
Marsh Corp., Jas. P., Chicago, Ill.
Monash-Younker Co., Chicago, Ill.
Mouat Vapor Heating Co., The, Cleveland, O.
• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
• Sterling, Inc., Milwaukee, Wis.
Stickle Steam Specialties Co., Indianapolis, Ind.
• Trane Co., The, La Crosse, Wis.
• Webster & Co., Warren, Camden, N. J.

SYSTEMS, HEATING, VAPOR

• American District Steam Co., North Tonawanda, N. Y.
• Autempco Corp., New York, N. Y.

• Advertisement in this issue. See Index to Advertisers, pages 367-368.

Barnes & Jones, Inc., Jamaica Plain, Boston, Mass.
Cashin Co., W. D., Boston, Mass.
• Dunham Co., C. A., Chicago, Ill.
Gorton Heating Corp., Cranford, N. J.
• Hoffman Specialty Co., Indianapolis, Ind.
• Illinois Engineering Co., Chicago, Ill.
Lord, Hawley & Hammell, Philadelphia, Pa.
Monash-Younker Co., Chicago, Ill.
Mouat Vapor Heating Co., The, Cleveland, O.
• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
• Sterling, Inc., Milwaukee, Wis.
• Trane Co., The, La Crosse, Wis.
Vapor Specialty Co., New York, N. Y.
• Webster & Co., Warren, Camden, N. J.

SYSTEMS, HEATING, ZONE CONTROL

Armstrong Heat Control Co., Portland, Ore.
• Autempco Corp., New York, N. Y.
Automatic Temperature Control Co., Inc. Philadelphia, Pa.
• Barber-Colman Co., Rockford, Ill.
Barnes & Jones, Inc., Jamaica Plain, Boston, Mass.
• Bell & Gossett Co., Morton Grove, Ill.
• Dunham Co., C. A., Chicago, Ill.
Heat Timer Corp., New York, N. Y.
• Illinois Engineering Co., Chicago, Ill.
• Johnson Service Co., Milwaukee, Wis.
Major Controls Sales Div., Cambridge, Mass.
Marsh Heating Equipment Co., Chicago, Ill.
• Mercoid Corp., Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
Spence Engineering Co., Inc., Walden, N. Y.
Sullivan Valve & Engineering Co., Butte, Mont.
Tallmadge & Co., Webster, East Orange, N. J.
• Thrush & Co., H. A., Peru, Ind.
• Webster & Co., Warren, Camden, N. J.
Webster Tallmadge & Co., East Orange, N. J.

SYSTEMS, PROCESS HEATING, HIGH TEMPERATURE

• Air Devices, Inc., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
• Dow Chemical Co., The, Midland, Mich.
• Dravo Corp., Pittsburgh, Pa.
Foster Wheeler Corp., New York, N. Y.
• Illinois Engineering Co., Chicago, Ill.
Lee Engineering Co., Youngstown, O.
Lord, Hawley & Hammell, Philadelphia, Pa.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
Parks-Cramer Co., Fitchburg, Mass.
Ross Engineering Corp., J. O., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Selas Corp. of America, Philadelphia, Pa.
• Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Trent Co., Harold E., Philadelphia, Pa.
Williams, Inc., F. C., Dearborn, Mich.
• Wing Mfg. Co., L. J., New York, N. Y.

SYSTEMS, ROOF SPRAYING (FOR COOLING ROOFS)

April Showers Co., Washington, D. C.
Goetti Bros. Metal Prod. Co., Phoenix, Ariz.
Rockwood Sprinkler Co., Worcester, Mass.
Ross Sprinkler Co., Pasadena, Calif.
Ruppright, Siegfried, Los Angeles, Calif.
Spray Engineering Co., Somerville, Mass.
• Spraying Systems Co., Chicago, Ill.
Thermal Industries, Indio, Calif.
Water Cooling Corp., New York, N. Y.

SYSTEMS, SPRINKLER, FOR AIR CONDITIONING DUCT SYSTEMS

American Cooling Tower Co., Kansas City, Mo.
Goetti Bros. Metal Prod. Co., Phoenix, Ariz.
Rockwood Sprinkler Co., Worcester, Mass.
Water Cooling Corp., New York, N. Y.

TANK HEADS

See Parts, for Heating and Air Conditioning Equipment

TANKS, EXPANSION, FOR HOT WATER HEATING SYSTEMS

• Bell & Gossett Co., Morton Grove, Ill.
Biggs Boiler Works Co., E. Akron, O.
Buffalo Tank Corp., Dunellen, N. J.
Caldwell Co., W. E., Louisville, Ky.
Case & Son Mfg. Co., W. A., Buffalo, N. Y.
Certified Furnace Co., Div. of Stainless & Steel Products Co., St. Paul, Minn.
Flori Pipe Co., The, St. Louis, Mo.
Frank Heaters, Inc., Paterson, N. J.
Kehm Corp., The, Chicago, Ill.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Maysteel Products, Inc., Milwaukee, Wis.
Scaife Co., Oakmont, Pa.
• Thrush & Co., H. A., Peru, Ind.
• Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Peru, Ind.
Western Blower Co., Seattle, Wash.

TANKS, PROCESS AND STORAGE

Aeroil Products Co., West New York, N. J.
• Aluminum Co. of America, Pittsburgh, Pa.
American Car & Foundry Co., New York, N. Y.
American Hard Rubber Co., New York, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
Ames Iron Works, Div. of Pierce Butler Radiator Corp, Oswego, N. Y.
• Bell & Gossett Co., Morton Grove, Ill.
Bigelow Co., New Haven, Conn.
Biggs Boiler Wks. Co., E. Akron, O.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Brownell Co., Dayton, O.
Buffalo Tank Corp., Dunellen, N. J.
Caldwell Co., W. E., Louisville, Ky.
Case & Son Mfg. Co., W. A., Buffalo, N. Y.
Certified Furnace Co., Div. of Stainless & Steel Products Co., St. Paul, Minn.
Chicago Bridge & Iron Co., Chicago, Ill.
Chicago Steel Tank Co., Chicago, Ill.
Columbian Steel Tank Co., Kansas City, Mo.
Connery Construction Co., Philadelphia, Pa.
Continental Diamond Fibre Co., Newark, Del.
Dahlquist Mfg. Co., Inc., Somerville, Mass.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Day Co., The, Minneapolis, Minn.
Devine Mfg. Co., Inc., J. P., Mt. Vernon, Ill.
Dillon Steam Boiler Wks., Inc., D. M., Fitchburg, Mass.
Downingtown Iron Works, Downingtown, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
Falstrom Co., Passaic, N. J.
Farquhar Co., Ltd., A. B., York, Pa.
Farrar & Trefts, Buffalo, N. Y.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Flori Pipe Co., The, St. Louis, Mo.
Frank Heaters, Inc., Paterson, N. J.
Frick Co., Waynesboro, Pa.
Gehri Co., Tacoma, Wash.
Gerstein & Cooper Co., South Boston, Mass.
Goetti Bros. Metal Prod. Co., Phoenix, Ariz.
Goodrich Co., B. F., Akron, O. (Rubber lined)
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Hamburg Boiler Wks., Inc., Hamburg, Pa.
Harris & Co., Arthur, Chicago, Ill.
Heat Transfer Products, Inc., Carbondale, Pa.
Hodge Boiler Works, Boston, Mass.
Illinois Oil Co., Rock Island, Ill.
International Boiler Wks. Co., East Stroudsburg, Pa.
International Engineering Wks., Framingham, Mass.
• Kewanee Boiler Corp., Kewanee, Ill.
Kirk & Blum Mfg. Co., Cincinnati, O.
Knight, Maurice A., Akron, O.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Koven & Bro., Inc., L. O., Jersey City, N. J.
La Crosse Tractor Co., La Crosse, Wis.
Lead Lined Iron Pipe Co., Wakefield, Mass.
Littleford Bros., Cincinnati, O.
Lumm Co., A. H., Toledo, O.
Manitowoc Boiler Wks., Manitowoc, Wis.
Maysteel Products, Inc., Milwaukee, Wis.
Murray Iron Wks. Co., Burlington, Ia.
National Lead Co., New York, N. Y.
• National Radiator Co., The, Johnstown, Pa.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Quaker City Iron Wks., Philadelphia, Pa.
Rheem Mfg. Co., San Francisco, Calif.
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Rosebraugh Co., W. W., Salem, Ore.
Scaife Co., Oakmont, Pa.
Sims Co., Erie, Pa.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Steinhorst & Sons, Inc., Emil, Utica, N. Y.
Strandwitz & Co., Inc., W. J., Camden, N. J.
Struthers Wells Corp., Titusville, Pa.
Tippett & Wood, Phillipsburg, N. J.
Trageser Copper Wks., Inc., Maspeth, Long Island, N. Y.
Uniflow Mfg. Co., Erie, Pa.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
Vesco Corp., New York, N. Y.
Walsh-Holyoke Steam Boiler Co., Holyoke, Mass.
Waterfilm Boilers, Inc., Jersey City, N. J.
Western Blower Co., Seattle, Wash.
Wheeling Steel Corp., Wheeling, W. Va. (Heater)
Whitlock Mfg. Co., Hartford, Conn.
Zallea Brothers & Johnson, Wilmington, Del.

TANKS, WASH, FOR CASTINGS

• Bell & Gossett Co., Morton Grove, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.

TEMPERATURE AND HUMIDITY CONTROLS

See Humidistats; Recorder-Controllers; Thermostats

TEMPERATURE RECORDERS

See Recorders, Temperature

• Advertisement in this issue. See Index to Advertisers, pages 367-368.

TEMPERATURE REGULATORS

See Regulators, Temperature

TEMPLATES, DRAWING, PIPING

Dietzgen Co., Eugene, Chicago, Ill.

TEST CHAMBERS

See Chambers, Test, Controlled Temperature and Humidity

TESTERS, GAGE, DEAD WEIGHT

Ashton Valve Co., Cambridge, Mass.
Dillon Co., Inc., W. C., Chicago, Ill.
Mansfield & Green, Cleveland, O.

THERMOMETERS, INDICATING, INDUSTRIAL

American Schaeffer & Budenberg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
American Thermometer Co., St. Louis, Mo.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Dillon Co., Inc., W. C., Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., La Crosse, Wis.
Equipoise Controls, New York, N. Y.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hill, E. Vernon, Chicago, Ill.
• Illinois Testing Laboratories, Inc., Chicago, Ill.
• Johnson Service Co., Milwaukee, Wis.
• Leeds & Northrup Co., Philadelphia, Pa.
Marsh Corp., Jas. P., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
• Martocello & Co., Jos. A., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Co., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
• Powers Regulator Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrometer Instrument Co., New York, N. Y.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Co., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

THERMOMETERS, INDICATING, REMOTE-READING

American Schaeffer & Budenberg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Electric Auto-Lite Co., Instrument & Gauge Div., La Crosse, Wis.
Fee & Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hotstream Heater Co., Cleveland, O.
• Illinois Testing Laboratories, Inc., Chicago, Ill.
• Johnson Service Co., Milwaukee, Wis.
• Leeds & Northrup Co., Philadelphia, Pa.
Marsh Corp., Jas. P., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Co., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
• Powers Regulator Co., Chicago, Ill.
Pyrometer Instrument Co., New York, N. Y.
Rochester Mfg. Co., Rochester, N. Y.
• Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Co., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.

THERMOMETERS, INDICATING, WALL

American Schaeffer & Budenberg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
American Thermometer Co., St. Louis, Mo.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Elmer & Amend, New York, N. Y.
Electric Auto-Lite Co., Instrument & Gauge Div., La Crosse, Wis.
Fee & Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hill, E. Vernon, Chicago, Ill.
• Illinois Testing Laboratories, Inc., Chicago, Ill.
• Leeds & Northrup Co., Philadelphia, Pa.
• Martocello & Co., Jos. A., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Co., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Pyrometer Instrument Co., New York, N. Y.
Rochester Mfg. Co., Rochester, N. Y.
• Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Co., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y. (Effective temperature indicator)

THERMOMETERS, KATA

Elmer & Amend, New York, N. Y.
G. M. Mfg. Co., New York, N. Y.
Palmer Co., Cincinnati (Norwood), O.
Precision Thermometer & Instrument Co., Philadelpia, Pa.

THERMOSTATIC BELLOWS

See Bellows, Thermostatic and Metallic

THERMOSTATIC BI-METALS

See Bi-Metals, Thermostatic

THERMOSTATIC TRAPS

See Traps, Steam, Thermostatic

THERMOSTATS, DUCT TYPE

Armstrong Heat Control Co., Portland, Ore.
Atlas Valve Co., Inc., Newark, N. J.
• Autempco Corp., New York, N. Y.
• Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., Newark, N. J.
• Detroit Lubricator Co., Detroit, Mich.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Henry Co., Paul, The, Controls Div., Los Angeles, Calif.
• Johnson Service Co., Milwaukee, Wis.
Leslie Co., Lyndhurst, N. J.
• Mercoid Corp., The, Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Moeller Instrument Co., Richmond Hills, N. Y.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
• Powers Regulator Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
• Sarco Co., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Standard Thermometer, Inc., Boston, Mass.
Superstat Co., Springfield, Mass.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Tallmadge & Co., Webster, East Orange, N. J.
• Taylor Instrument Companies, Rochester, N. Y.
United Electric Controls Co., Boston, Mass.
Vapor Car Heating Co., Inc., Chicago, Ill.
Webster Tallmadge & Co., East Orange, N. J.
• White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, EFFECTIVE TEMPERATURE

• Barber-Colman Co., Rockford, Ill.
• Illinois Engineering Co., Chicago, Ill.
• Johnson Service Co., Milwaukee, Wis.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Powers Regulator Co., Chicago, Ill.
Sarcotherm Controls, Inc., New York, N. Y.

THERMOSTATS, IMMERSION

American Instrument Co., Silver Spring, Md.
Armstrong Heat Control Co., Portland, Ore.
Atlas Valve Co., Inc., Newark, N. J.
• Autempco Corp., New York, N. Y.
• Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., Newark, N. J.
• Detroit Lubricator Co., Detroit, Mich.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
• Fenwal, Inc., Ashland, Mass.
• General Controls Co., Glendale, Calif.
H-B Instrument Co., Philadelphia, Pa.
Hart Mfg. Co., Hartford, Conn.
Henry Co., Paul, The, Controls Div., Los Angeles, Calif.
Industrial Engineering Corp., Terre Haute, Ind.
• Johnson Service Co., Milwaukee, Wis.
Klipfel Mfg. Co., Chicago, Ill.
Leslie Co., Lyndhurst, N. J.
Master Electric Co., Aircraft & Electrical Controls Div., Dayton, O.
• Mercoid Corp., The, Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
• Powers Regulator Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Sampsel Time Control, Inc., Spring Valley, Ill.
• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Struthers Dunn, Inc., Philadelphia, Pa.

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Superstat Co., Springfield, Mass.
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
United Electric Controls Co., Boston, Mass.
Vapor Car Heating Co., Inc., Chicago, Ill.
Warren Electric Appliance Co., Warren, Pa.
Westinghouse Electric Corp., Heating Section, Meadville, Pa.
White Mfg. Co., St. Paul, Minn.
• White-Rodgers Electric Co., St. Louis, Mo.
Wilcolator Co., Elizabeth, N. J.

THERMOSTATS, RADIANT HEAT

• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., Chicago, Ill.

THERMOSTATS, ROOM OR WALL

Armstrong Heat Control Co., Portland, Ore.
• Autempco Corp., New York, N. Y.
• Automatic Products Co., Milwaukee, Wis.
• Barber-Colman Co., Rockford, Ill.
Crise Elec. Mfg. Co., Columbus, O.
Crown Controls Co., New Bremen, O.
• Detroit Lubricator Co., Detroit, Mich.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
• Fulton Sylphon Co., Knoxville, Tenn.
• General Controls Co., Glendale, Calif.
Gleason-Avery, Inc., Auburn, N. Y.
Henry Co., Paul, The, Controls Div., Los Angeles, Calif.
• Illinois Engineering Co., Chicago, Ill.
Industrial Engineering Corp., Terre Haute, Ind.
• Johnson Service Co., Milwaukee, Wis.
Marsh Heating Equipment Co., Chicago, Ill.
Master Electric Co., Aircraft & Electrical Controls Div., Dayton, O.
Master Electric Co., Dayton, O.
McCorkle Co., D. H., Berkeley, Calif.
• Mercoid Corp., The, Chicago, Ill.
Miller Heat-O-Meter Co., Milwaukee, Wis.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
• Powers Regulator Co., Chicago, Ill.
Sampsel Time Control, Inc., Spring Valley, Ill.
• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Spencer Thermostat Co., Attleboro, Mass.
Superstat Co., Springfield, Mass.
Tallmadge & Co., Webster, East Orange, N. J
• Thrush & Co., H. A., Peru, Ind.
Triplex Heating Specialty Co., Peru, Ind.
United Electric Controls Co., Boston, Mass.
Vapor Car Heating Co., Inc., Chicago, Ill.
Webster Tallmadge & Co., East Orange, N. J.
White Mfg. Co., St. Paul, Minn.
• White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, SURFACE

Armstrong Heat Control Co., Portland, Ore.
• Autempco Corp., New York, N. Y.
• Barber-Colman Co., Rockford, Ill.
• Detroit Lubricator Co., Detroit, Mich.
• Fenwal, Inc., Ashland, Mass.
Hart Mfg. Co., Hartford, Conn.
Henry Co., Paul, The, Controls Div., Los Angeles, Calif.
Industrial Engineering Corp., Terre Haute, Ind.
Master Electric Co., Aircraft & Electrical Controls Div., Dayton, O.
McCorkle Co., D. H., Berkeley, Calif.
• Mercoid Corp., The, Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
• Powers Regulator Co., Chicago, Ill.
• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Spencer Thermostat Co., Attleboro, Mass.
Struthers Dunn, Inc., Philadelphia, Pa.
Superstat Co., Springfield, Mass.
Triplex Heating Specialty Co., Peru, Ind.
United Electric Controls Co., Boston, Mass.
Westinghouse Electric Corp., Heating Section, Meadville, Pa.
White Mfg. Co., St. Paul, Minn.
• White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, TWO TEMPERATURE OR DUAL

Armstrong Heat Control Co., Portland, Ore.
• Autempco Corp., New York, N. Y.
• Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., Newark, N. J.
• Detroit Lubricator Co., Detroit, Mich.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
• General Controls Co., Glendale, Calif.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Gleason-Avery, Inc., Auburn, N. Y.
H-B Instrument Co., Philadelphia, Pa.
• Illinois Engineering Co., Chicago, Ill.
Industrial Engineering Corp., Terre Haute, Ind.
• Johnson Service Co., Milwaukee, Wis.
Master Electric Co., Aircraft & Electrical Controls Div., Dayton, O.
• Mercoid Corp., The, Chicago, Ill.
Miller Heat-O-Meter Co., Milwaukee, Wis.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
• Powers Regulator Co., Chicago, Ill.
Ranco, Inc., Columbus, O.
Sampsel Time Control, Inc., Spring Valley, Ill.
• Sarco Co., Inc., New York, N. Y.
Superstat Co., Springfield, Mass.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Tallmadge & Co., Webster, East Orange, N. J.
United Electric Controls Co., Boston, Mass.
Vapor Car Heating Co., Inc., Chicago, Ill.
Webster Tallmadge & Co., East Orange, N. J.
• White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, WEATHER COMPENSATING

• Autempco Corp., New York, N. Y.
• Barber-Colman Co., Rockford, Ill.
• Detroit Lubricator Co., Detroit, Mich.
Heat Timer Corp., New York, N. Y.
• Illinois Engineering Co., Chicago, Ill.
• Johnson Service Co., Milwaukee, Wis.
Lawler Automatic Controls, Mount Vernon, N. Y.
Major Controls Sales Div., Cambridge, Mass.
Marsh Heating Equipment Co., Chicago, Ill.
Miller Heat-O-Meter Co., Milwaukee, Wis.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Powers Regulator Co., Chicago, Ill.
• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Tallmadge & Co., Webster, East Orange, N. J.
• Thrush & Co., H. A., Peru, Ind.
United Electric Controls Co., Boston, Mass.
Webster Tallmadge & Co., East Orange, N. J.

TIME SWITCHES

See Switches, Time

TOGGLE BOLTS

See Bolts, Toggle and Anchor

TONGS, PIPE

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Jarecki Mfg. Co., Erie, Pa.
Trimont Mfg. Co., Boston, Mass.
Williams & Co., J. H., Buffalo, N. Y.

TOOLS (CHISELS, PLIERS, SCREW DRIVERS, ETC.)

Acme Steel Co., Chicago, Ill. (Strapping tools for holding insulation in place on ducts, pipes, tanks, etc.)
Bernz Co., Inc., Otto, Rochester, N. Y.
Billings & Spencer Co., Hartford, Conn.
• Bonney Forge & Tool Works, Allentown, Pa.
Crescent Tool Co., Jamestown, N. Y.
Everhot Products Co., Chicago, Ill.
Greene, Tweed & Co., New York, N. Y.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Hartwell Engineering Co., Los Angeles, Calif. (Numerous production tools, drill protectors and depth gages, etc.)
International Nutyp Tool Co., Oswego, N. Y.
Mid-States Equipment Co., Chicago, Ill. (Saw gun)
Millers Falls Co., Greenfield, Mass.
Parker-Kalon Corp., New York, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Persson Co., T. G., Bloomfield, N. J. (flange jacks)
Rawlplug Co., Inc., The, New York, N. Y. (drills for masonry)
Snap-On Tools Corp., Kenosha, Wis.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Williams & Co., J. H., Buffalo, N. Y.

TOOLS, FLARING, FOR TUBING

Everhot Products Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Leonard Precision Products Co., Garden Grove, Calif.
Parker Appliance Co., The, Cleveland, O.
Sac Tool Mfg. Co., St. Louis, Mo.

TORCHES, BRAZING AND SOLDERING

Aeroil Products Co., West New York, N. J.
• Air Reduction Sales Co., New York, N. Y.
Atkins & Co., E. C., Indianapolis, Ind.
Bernz Co., Inc., Otto, Rochester, N. Y.
Black Mfg. Co., The, Baltimore, Md.
Century Aircraft Co., Inglewood, Calif.
• Clayton & Lambert Mfg. Co., Detroit, Mich.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Ergolyte Mfg. Co., Philadelphia, Pa.
Harris Calorific Co., The, Cleveland, O.
Ideal Commutator Dresser Co., Sycamore, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Insto-Gas Corp., Detroit, Mich.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Marquette Mfg. Co., Minneapolis, Minn.
Mid-States Equipment Co., Chicago, Ill.
Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
National Safety Device Co., Chicago, Ill.
Reiner & Campbell Co., Inc., Elizabeth, N. J.

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Sac Tool Mfg. Co., St. Louis, Mo.
Sight Feed Generator Co., Richmond, Ind.
Smith Welding Equipment Corp., Minneapolis, Minn.
Torchweld Equipment Div., National Cylinder Gas Co., Chicago, Ill.
Torit Mfg. Co., St. Paul, Minn.
Trindl Products, Ltd., Chicago, Ill.
Turner Brass Works, The, Sycamore, Ill.
Victor Equipment Co., San Francisco, Calif.
Wall Chemicals Div. of The Liquid Carbonic Corp., Chicago, Ill.
Welding Apparatus Co., Chicago, Ill.

TORQUE INDICATING WRENCHES

See Wrenches, Torque Indicating

TOWERS, COOLING, ATMOSPHERIC

American Cooling Tower Co., Kansas City, Mo.
• Binks Mfg. Co., Chicago, Ill.
Burhorn Co., Edwin, New York, N. Y.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Foster Wheeler Corp., New York, N. Y.
Harry Cooling Towers, Inc., New York, N. Y.
• Lilie-Hoffman Cooling Towers, Inc., St. Louis, Mo.
Marley Co., Inc., Kansas City, Kan.
National Engineering & Mfg. Co., Kansas City, Mo.
• New England Cooling Tower Co., Boston, Mass.
Pennsylvania Engineering Wks., New Castle, Pa.
Phillips Cooling Tower Co., Inc., New York, N. Y.
Pritchard & Co., J. F., Kansas City, Mo.
Research Corp., New York, N. Y.
• Spraying Systems Co., Chicago, Ill.
Stewart Ice Machine Co., Los Angeles, Calif.
Thermal Industries, Indio, Calif.
Tippett & Wood, Phillipsburg, N. J.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Corp., St. Louis, Mo.
Water Cooling Tower Co., Chicago, Ill.
• Young Radiator Co., Racine, Wis. (radiator type)

TOWERS, COOLING, MECHANICAL DRAFT

American Cooling Tower Co., Kansas City, Mo.
• Binks Mfg. Co., Chicago, Ill.
Burhorn Co., Edwin, New York, N. Y.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Foster Wheeler Corp., New York, N. Y.
Harry Cooling Towers, Inc., New York, N. Y.
• Lilie-Hoffmann Cooling Towers, Inc., St. Louis, Mo.
Marley Co., Inc., Kansas City, Kan.
• Murray Mfg. Co., D. J., Wausau, Wis.
National Engineering & Mfg. Co., Kansas City, Mo.
• New England Cooling Tower Co., Boston, Mass.
Pennsylvania Engineering Wks., New Castle, Pa.
Phillips Cooling Tower Co., Inc., New York, N. Y.
Pritchard & Co., J. F., Kansas City, Mo.
Research Corp., New York, N. Y.
Rogers Diesel & Aircraft Corp., New York, N. Y.
Thermal Industries, Indio, Calif.
• Trane Co., The, LaCrosse, Wis.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Corp., St. Louis, Mo.
Water Cooling Tower Co., Chicago, Ill.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.

TRANSFORMERS, ELECTRIC

Bogue Electric Co., Paterson, N. J.
Davis & Co., Inc., Dean W., Kentland, Ind.
Elmer & Amend, New York, N. Y.
General Electric Co., Schenectady, N. Y.
Jefferson Electric Co., Bellwood, Ill.
Leach Relay Co., Los Angeles, Calif.
Master Electric Co., Aircraft & Electrical Controls Div., Dayton, O.
• Sola Electric Co., Chicago, Ill.
• Wagner Electric Corp., St. Louis, Mo.
Webster Electric Co., Racine, Wis.
• West Coast Electrical Mfg. Co., Los Angeles, Calif.

TRANSMISSION DRIVES

See Drives, Chain, Flat Belt and V-Belt

TRAP, INSULATION, STEAM

See Insulation, Steam Trap

TRAPS, STEAM, MECHANICAL

• American District Steam Co., North Tonawanda, N. Y.
• Anderson Co., V. D., The, Cleveland, O.
• Armstrong Machine Wks., Three Rivers, Mich.
Barnes & Jones, Inc., Jamaica Plain, Boston, Mass.
• Bishop & Babcock Mfg. Co., Cleveland, O.
Boylston Steam Specialty Co., Chicago, Ill.
Bundy Steam Trap Co., Nashua, N. H.
Burrows Mfg. Co., F. A., York, Pa.
Cashin Co., W. D., Boston, Mass.
Coe Mfg. Co., Painesville, O.
• Connor Engineering Corp., W. B., New York, N. Y.
• Crane Co., Chicago, Ill.
Cryer Trap & Valve Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Davis Regulator Co., Chicago, Ill.
• Dunham Co., C. A., Chicago, Ill.
Ellis Drier Co., Chicago, Ill.
• Fisher Governor Co., Marshalltown, Ia.
• Haines & Co., William S., Philadelphia, Pa.
Healy Ruff Co., St. Paul, Minn.
• Hoffman Specialty Co., Indianapolis, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
• Illinois Engineering Co., Chicago, Ill.
• Johnson Corp., Three Rivers, Mich.
Justus Steam Trap Co., Napanoch, N. Y.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
• Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Chicago, Ill.
Marsh Corp., Jas. P., Chicago, Ill.
• McAlear Mfg. Co., Chicago, Ill.
McAuley Trap Co., Pittsburgh, Pa.
Milwaukee Valve Co., Milwaukee, Wis.
Monash-Younker Co., Chicago, Ill.
Morehead Mfg. Co., Detroit, Mich.
Mouat Vapor Heating Co., The, Cleveland, O.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Nason Co., Detroit, Mich.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
• Sarco Co., Inc., New York, N. Y.
• Schaub Engineering Co., Fred H., Chicago, Ill.
Squires Co., C. E., Cleveland, O.
• Sterling, Inc., Milwaukee, Wis.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong, Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., Cleveland, O.
Swendeman, Inc., Boston, Mass.
• Templeton Bros., Inc., Walpole, Mass. (Return)
Templeton Mfg. Co., Hyde Park, Mass.
• Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Vapor Specialty Co., New York, N. Y.
Watson & McDaniel Co., Philadelphia, Pa.
• Webster & Co., Warren, Camden, N. J.
Williams Gauge Co., Pittsburgh, Pa.
Wright-Austin Co., Detroit, Mich.
• Yarnall-Waring Co., Philadelphia, Pa.

TRAPS, STEAM, THERMOSTATIC

• American District Steam Co., North Tonawanda, N. Y.
Barnes & Jones, Inc., Jamaica Plain, Boston, Mass.
• Bishop & Babcock Mfg. Co., Cleveland, O.
Capitol Brass Works, Div. of Bohn Aluminum & Brass Corp., Detroit, Mich.
Cashin Co., W. D., Boston, Mass.
Clifford Mfg. Co., Boston, Mass.
Cryer Trap & Valve Co., Inc., New York, N. Y.
• Dunham Co., C. A., Chicago, Ill.
• Haines & Co., William S., Philadelphia, Pa.
• Hoffman Specialty Co., Indianapolis, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
• Illinois Engineering Co., Chicago, Ill.
Marsh Corp., Jas. P., Chicago, Ill.
• McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Monash-Younker Co., Chicago, Ill.
Mouat Vapor Heating Co., The, Cleveland, O.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
• Powers Regulator Co., Chicago, Ill.
• Sarco Co., Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
• Sterling, Inc., Milwaukee, Wis.
Stickle Steam Specialties Co., Indianapolis, Ind.
Swartwout Co., Cleveland, O.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Vapor Car Heating Co., Inc., Chicago, Ill.
Vapor Specialty Co., New York, N. Y.
• Webster & Co., Warren, Camden, N. J.

TREATMENT, STEAM SYSTEM, TO INHIBIT CORROSION

• Anderson-Stolz Corp., Kansas City, Mo.
• Apex All Weather Products, Chicago, Ill.
• Apex Engineering Co., Chicago, Ill.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Cannon Chemical Co., Everett, Mass.
• Dowell, Inc., Tulsa, Okla.
Elgin Softener Corp., Elgin, Ill.
Graver Tank & Mfg. Co., Inc., East Chicago, Ill.
Haering Co., Inc., D. W., Chicago, Ill.
%Proportioneers, Inc.%, Providence, R. I.
Rid-Sludge Chemical Co., Minneapolis, Minn. (vapor treatment to remove sludge from heating system)
• Turco Products, Inc., Los Angeles, Calif.
Vinco Co., Inc., The, New York, N. Y.
Water Treatment Co. of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.
Whiting Stoker Sales Co., Chicago, Ill.

TREATMENT, WATER, TO INHIBIT CORROSION

Activator Process Sales Co., Alhambra, Calif.
• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American K. A. T. Corp., New York, N. Y.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Anderson-Stolz Corp., Kansas City, Mo.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Automatic Pump & Softener Corp., Rockford, Ill.
Calgon, Inc., Pittsburgh, Pa.
• Cannon Chemical Co., Everett, Mass.

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Cochrane Corp., Philadelphia, Pa.
Continental Products Co., Euclid, O.
Dearborn Chemical Co., Chicago, Ill.
Electroaire Corp., Chicago, Ill.
Elgin Softener Corp., Elgin, Ill.
Ferro-Nil Corp., New York, N. Y.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Grief, Edward C., Bogota, N. J.
Haering Co., D. W., Chicago, Ill.
• Hagan Corp., Pittsburgh, Pa.
Maintenance Engineering Corp., Houston, Tex.
Metropolitan Refining Co., Long Island City, N. Y.
Monsanto Chemical Co., Organic Chemicals Div., St. Louis, Mo.
Mutual Chemical Co. of America, New York, N. Y.
National Aluminate Corp., Chicago, Ill.
North American Fibre Products Co., The, Cleveland, O.
Norwood Filtration Co., The, Florence, Mass.
Oakite Products, Inc., New York, N. Y.
% Proportioneers, Inc., %, Providence, R. I.
Permutit Co., New York, N. Y.
R. U. V. Engineering Corp., South Norwalk, Conn.
Red Jacket Mfg. Co., Davenport, Ia.
Refinite Corp., Omaha, Nebr.
• Research Products Corp., Madison, Wis.
Solvay Sales Corp., New York, N. Y.
Sudbury Laboratory, South Sudbury, Mass.
• Turco Products, Inc., Los Angeles, Calif.
Uniflow Mfg. Co., Erie, Pa.
Vinco Co., Inc., The, New York, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.
Water Refining Co., Ft. Wayne, Ind.
Water Service Laboratories, Inc., New York, N. Y.
Water Treatment Company of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.
Whiting Stoker Sales Co., Chicago, Ill.
Worthington Pump & Machinery Corp., Harrison, N. J.

TREATMENT, WATER, FOR SLIME AND ALGAE CONTROL

Aquatic Chemical Laboratories, Inc., New York, N. Y.
• Carolina Aniline & Extract Co., Inc., Charlotte, N. C.
Haering Co., Inc., D. W., Chicago, Ill.
Oakite Products, Inc., New York, N. Y.
% Proportioneers, Inc. %, Providence, R. I.
Wallace & Tiernan Co., Inc., Newark, N. J.
Western Chemical Co., Kansas City, Mo.

TRY-COCKS, BOILER

Blackburn-Smith Mfg. Co., Hoboken, N. J.
Eclipse Fuel Engineering Co., Rockford, Ill.
Reliance Gauge Column Co., Cleveland, O.

TUBE CLEANERS

See Cleaners, Tube

TUBES, BOILER

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Babcock & Wilcox Co., New York, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Detroit Seamless Steel Tubes Co., Detroit, Mich.
Globe Steel Tubes Co., Milwaukee, Wis.
Keeney Mfg. Co., Newington, Conn.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Standard Tube Co., Highland Park, Mich.
Steel & Tubes Div., Republic Steel Corp., Cleveland, O.
Timken Roller Bearing Co., Steel & Tube Div., Canton, O.

TUBES, PITOT

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
Hill, E. Vernon, Chicago, Ill.
Meriam Instrument Co., The, Cleveland, O.

TUBING, ALUMINUM

• Aluminum Co. of America, Pittsburgh, Pa.
Brasco Mfg. Co., Harvey, Ill.
• Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
• Revere Copper and Brass Incorporated, New York, N. Y.

TUBING BENDERS

See Benders, Tubing

TUBING, BRASS AND COPPER

• American Brass Co., Waterbury, Conn.
Brasco Mfg. Co., Harvey, Ill.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Downs-Smith Brass & Copper Co., New York, N. Y.
Everhot Products Co., Chicago, Ill.
Hussey & Co., C. G., Pittsburgh, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
• Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
• Mueller Brass Co., Port Huron, Mich.
Phelps Dodge Copper Products Corp., British American Tube Div., New York, N. Y.
Pipe and Tube Products, Inc., New York, N. Y.
• Revere Copper and Brass Incorporated, New York, N. Y.
Roberts Tube Works, Detroit, Mich.
Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.

TUBING CUTTERS

See Cutters, Tubing

TUBING, FINNED

Aerofin Corp., Syracuse, N. Y.
Brown Fintube Co., The, Elyria, O.
• Bush Mfg. Co., Hartford, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
• Extended Surface Div. of David E. Kennedy, Inc., Brooklyn, N. Y.
G. & O. Mfg. Co., New Haven, Conn.
Griscom-Russell Co., The, New York, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
• McCord Corp., Detroit, Mich.
• McQuay, Inc., Minneapolis, Minn.
• Peerless of America, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rempe Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
• Tenney Engineering, Inc., Newark, N. J.
Vapor Car Heating Co., Inc., Chicago, Ill.
Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich. (Aluminum, copper)

TUBING, MAGNESIUM

Dow Chemical Co., The, Midland, Mich.
• Revere Copper & Brass, Inc., New York, N. Y.

TUBING, NICKEL AND NICKEL ALLOY

• Agaloy Tubing Co., Springfield, O.
Brasco Mfg. Co., Harvey, Ill.
Bundy Tubing Co., Detroit, Mich.
Chase Brass & Copper Co., Waterbury, Conn.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Globe Steel Tubes Co., Milwaukee, Wis.
International Nickel Co., New York, N. Y.
Pittsburgh Steel Co., Pittsburgh, Pa.
• Revere Copper and Brass Incorporated, New York, N. Y.

TUBING, PLASTIC

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill.
Carter Products Corp., Cleveland, O.
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Commercial Plastics Co., Chicago, Ill.
Extruded Plastics, Inc., Norwalk, Conn.
Firestone Tire & Rubber Co., Akron, O.
General Electric Co., Plastics Div., Pittsfield, Mass.
Goodrich Co., B. F., Akron, O.
Hodgman Rubber Co., Framingham, Mass.
Irvington Varnish and Insulator Co., Irvington, N. J.
Mills Corp., Elmer E., Chicago, Ill.
North Penn Co., New York, N. Y.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
Parker Appliance Co., The, Cleveland, O.
Resistoflex Corp., Belleville, N. J.
Sandee Mfg. Co., Chicago, Ill.
Skuttle Mfg. Co., Detroit, Mich.
United States Stoneware Co., New York, N. Y.
Yardley Plastics Co., Columbus, O.

TUBING, SILVER CLAD AND SILVER ALLOY

General Plate Div., Metals & Controls Corp., Attleboro, Mass.

TUBING, STEEL, ALLOY, SEAMLESS

• Agaloy Tubing Co., Springfield, O.
Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Detroit Seamless Steel Tubes Co., Detroit, Mich.
Globe Steel Tubes Co., Milwaukee, Wis.
National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
• Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Timken Roller Bearing Co., Steel & Tube Div., Canton, O.
• Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, ALLOY, WELDED

• Agaloy Tubing Co., Springfield, O.
Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Carpenter Steel Co., The, Welded Alloy Tube Div., Kenilworth, N. J.
Duraloy Co., Scottdale, Pa.
Laclede Steel Co., St. Louis, Mo.
• Revere Copper and Brass Incorporated, New York, N. Y.
• Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Steel and Tubes Div., Republic Steel Corp., Cleveland, O.
Trent Tube Mfg. Co., East Troy, Wis.
• Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, SEAMLESS

• Agaloy Tubing Co., Springfield, O.
Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Detroit Seamless Steel Tubes Co., Detroit, Mich.
Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
Pipe and Tube Products, Inc., New York, N. Y.
Pittsburgh Steel Co., Pittsburgh, Pa.
• Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Timken Roller Bearing Co., Steel & Tube Div., Canton, O.
• Youngstown Sheet & Tube Co., Youngstown, O.

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TUBING, STEEL, WELDED

• Agaloy Tubing Co., Springfield, O.
Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Babcock & Wilcox Tube Co., The, Welded Tube Div., Alliance, O.
Bundy Tubing Co., Detroit, Mich.
Carpenter Steel Co., The, Welded Alloy Tube Div., Kenilworth, N. J.
Everhot Products Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
Pittsburgh Steel Co., Pittsburgh, Pa.
Pittsburgh Tube Co., Pittsburgh, Pa.
• Revere Copper and Brass Incorporated, New York, N. Y.
South Chester Tube Co., Chester, Pa.
• Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Standard Tube Co., Highland Park, Mich.
Steel and Tubes Div., Republic Steel Corp., Cleveland, O.
• Wheatland Tube Co., Philadelphia, Pa.
• Youngstown Sheet & Tube Co., Youngstown, O.

TURBINES, MECHANICAL DRIVE

• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Carling Blower Co., Worcester, Mass.
Coppus Engineering Corp, Worcester, Mass
Dean Hill Pump Co., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Elliott Co., Jeannette, Pa.
General Electric Co., Schenectady, N. Y.
Moore Steam Turbine Div., Worthington Pump and Machinery Corp., Wellsville, N. Y.
Murray Iron Wks. Co., Burlington, Ia.
• Pyle-National Co., The, Chicago, Ill.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
Terry Steam Turbine Co., Hartford, Conn.
Westinghouse Electric Corp., East Pittsburgh, Pa.
• Wing Mfg. Co., L. J., New York, N. Y.

2, 3 AND 4-WAY VALVES

See Valves, 2, 3 and 4-way

UNDERGROUND PIPING

See Conduit, Underground Piping

UNIONS, BRASS

Acheson Mfg. Co., Rankin, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
Bowser, Inc., Fort Wayne, Ind.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
• Crane Co., Chicago, Ill.
Downs-Smith Brass & Copper Co., New York, N. Y.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
• General Fittings Co., Providence, R. I.
Grabler Mfg. Co., Cleveland, O.
• Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
• Kennedy Valve Mfg. Co., The, Elmira, N. Y.
King Union Co., Inc., Hillsgrove, R. I.
Leavitt Machine Co., Orange, Mass.
Lunkenheimer Co., Cincinnati, O.
• Mueller Brass Co., Port Huron, Mich.
Parker Appliance Co., Cleveland, O.
Phoenix Brass Fittings Corp., Irvington, N. J.
Powell Co., Wm., Cincinnati, O.
Rhode Island Fittings Co., Hillsgrove, R. I.
Schaible Co., The, Cincinnati, O.
Union Metal Works, Chelsea, Mass.
• Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P. Blossburg, Pa.

UNIONS, MALLEABLE, BRASS SEAT

Corley Co., Jersey City, N. J.
• Crane Co., Chicago, Ill.
Dart Mfg. Co., E. M., Providence, R. I.
Detroit Brass & Malleable Wks., Detroit, Mich.
Fairbanks Co., New York, N. Y.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
• General Fittings Co., Providence, R. I.
Grabler Mfg. Co., Cleveland, O.
• Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
• Jefferson Union Co., Inc., New York, N. Y.
• Kennedy Valve Mfg. Co., The, Elmira, N. Y.
King Union Co., Inc., Hillsgrove, R. I.
Malleable Iron Fittings Co., Branford, Conn.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Rhode Island Fittings Co., Hillsgrove, R. I.
Rockwood Sprinkler Co., Worcester, Mass.
Star Mfg. Co., Inc., Providence, R. I.
Stockham Pipe Fittings Co., Birmingham, Ala.
United Superior Union Co., Inc., Brooklyn, N. Y.
• Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburg, Pa.

UNIONS, ORIFICE

Hamer Oil Tool Co., Long Beach, 7, Calif.
Ladish Drop Forge Co., Fittings Div., Cudahy, Wis.
• Watson-Stillman Co., Roselle, N. J.

UNIONS, STEEL

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
Catawissa Valve & Fittings Co., Catawissa, Pa.
Champion Machine & Forging Co., Cleveland, O.
Colonial Alloys Co., Metals Div., Philadelphia, Pa. (Stainless)
• Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Frick Co., Waynesboro, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
Rockwood Sprinkler Co., Worcester, Mass.
Roessing Mfg. Co., Pittsburgh, Pa.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.
• Watson-Stillman Co., Roselle, N. J.

UNIT COOLERS

See Coolers, Unit

UNIT HEATERS

See Heaters, Unit

UNIT VENTILATORS

See Ventilators, Unit

UNITS, AIR CONDITIONING, CENTRAL STATION TYPE

Self contained blower, heating and/or cooling coil, filter, humidifier unit for remote location and duct air distribution

• Air & Refrigeration Corp., New York, N. Y.
• Airtemp Div. of Chrysler Corp., Dayton, O.
• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
Anetsberger Bros., Chicago, Ill.
• Baker Ice Machine Co., Inc., Omaha, Neb.
Beacon-Morris Corp., Boston, Mass. (Custom built)
Betz Corp., Hammond, Ind.
Bryant Heater Co., The, Cleveland, O.
• Buffalo Forge Co., Buffalo, N. Y.
• Carrier Corp., Syracuse, N. Y.
• Clarage Fan Co., Kalamazoo, Mich.
• Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis Mo.
Draver & Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
• Fedders Mfg. Co., Inc., Buffalo, N. Y.
Forman Air Conditioning & Engrg. Co., New York, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Hastings Air Conditioning Co., Hastings, Neb.
Howe Ice Machine Co., Chicago, Ill.
• Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
• Ilg Electric Ventilating Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
• Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Manufacturers Fin Coil Co., Chicago, Ill.
• Mario Coil Co., St. Louis, Mo.
• McQuay, Inc., Minneapolis, Minn.
Michell Air Conditioning Co., Inc., Schenectady, N. Y.
Niagara Blower Co., New York, N. Y.
Palmer Mfg. Corp., Phoenix, Ariz.
Parks-Cramer Co., Fitchburg, Mass.
• Peerless of America, Inc., Chicago, Ill.
Pernot & Rich, Inc., Los Angeles, Calif.
Refrigeration Economics Co., Inc., Canton, O.
• Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Standard Computing Scale Co., The, Air Conditioning and Refrigeration Div., Detroit, Mich.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
• Surface Combustion Corp., Toledo, O.
• Trane Co., The, La Crosse, Wis.
United States Radiator Corp., Detroit, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Springfield, Mass.
Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
• Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
• Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, HORIZONTAL PACKAGE TYPE

Self contained blower, cooling and/or heating coil, filter, humidifier unit for ceiling or platform location in space condition, for connection to remote compressor or cold water supply, and steam or hot water

• Airtemp, Div. of Chrysler Corp., Dayton, O.
American Blower Corp., Detroit, Mich.
• Baker Ice Machine Co., Inc., Omaha, Neb.
Beacon-Morris Corp., Boston, Mass. (Custom built)
Betz Corp., Hammond, Ind.
• Buffalo Forge Co., Buffalo, N. Y.
• Carrier Corp., Syracuse, N. Y.
Champion Unit Heater Co., Chicago, Ill.
• Clarage Fan Co., Kalamazoo, Mich.
Conditionaire Unit Co., Chicago, Ill.

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• Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer & Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
• Fedders Mfg. Co., Inc., Buffalo, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Hastings Air Conditioning Co., Hastings, Neb.
• Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
• Ilg Electric Ventilating Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
• Kennard Corp., St. Louis, Mo.
King Ventilating Co., Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
Manufacturers Fin Coil Co., Chicago, Ill.
• Marlo Coil Co., St. Louis, Mo.
Mayflower Air-Conditioners, Inc., St. Paul, Minn.
• McQuay, Inc., Minneapolis, Minn.
Niagara Blower Co., New York, N. Y.
• Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rempe Co., Chicago, Ill.
• Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Stainless & Steel Products Co., St. Paul, Minn.
Standard Computing Scale Co., The, Air Conditioning and Refrigeration Div., Detroit, Mich.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
• Trane Co., The, La Crosse, Wis.
• United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Springfield, Mass.
• Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
• Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, INDUSTRIAL TYPE

• Air & Refrigeration Corp., New York, N. Y.
Allen Corp., Detroit, Mich. (Make-up air units)
Alton Mfg. Co., Dallas, Tex.
American Blower Corp., Detroit, Mich.
American Coils Inc., Newark, N. J.
American Cooling Tower Co., Kansas City, Mo.
Anetsberger Bros., Chicago, Ill.
Bahnson Co., Winston-Salem, N. C.
• Baker Ice Machine Co., Inc., Omaha, Neb.
Beacon-Morris Corp., Boston, Mass. (Custom built)
Betz Corp., Hammond, Ind.
Bryant Heater Co., The, Cleveland, O.
• Buffalo Forge Co., Buffalo, N. Y.
• Carrier Corp., Syracuse, N. Y.
• Clarage Fan Co., Kalamazoo, Mich.
• Curtis Refrigeration Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer & Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
Economy Equipment Co., Inc., Chicago, Ill.
• Fedders Mfg. Co., Inc., Buffalo, N. Y.
Frick Co., Waynesboro, Pa.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
International Moistening Co., Providence, R. I.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
• Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Lintern Co., Berea, O.
Manufacturers Fin Coil Co., Chicago, Ill.
• Marlo Coil Co., St. Louis, Mo.
• McQuay, Inc., Minneapolis, Minn.
New York Blower Co., Chicago, Ill. (Make-up air units)
Niagara Blower Co., New York, N. Y.
Norwood Filtration Co., The, Florence, Mass.
Parks-Cramer Co., Fitchburg, Mass.
• Peerless of America, Inc., Chicago, Ill.
Pfening Co., Fred D., Columbus, O.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rempe Co., Chicago, Ill.
Research Corp., New York, N. Y.
Ross Engineering Corp., J. O., New York, N. Y.
• Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Somers, Inc., H. J., Detroit, Mich.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
• Surface Combustion Corp., Toledo, O.
• Tenney Engineering, Inc., Newark, N. J. (Including test chambers)
• Trane Co., The, La Crosse, Wis.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Springfield, Mass.
• Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
• Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, SUMMER, EVAPORATIVE COOLING TYPE

For cooling with sprays, no dehumidification

• Air & Refrigeration Corp., New York, N. Y.
American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
American Metal Products Co., Fort Worth, Tex.
April Showers Co., Washington, D. C.
Aqua-Mist Co., Topeka, Kans.
Bahnson Co., Winston-Salem, N. C.
Beacon-Morris Corp., Boston, Mass.
Beckett & Co., Thomas, Dallas, Tex.
Bien Air Conditioning Co., Monterey Park, Calif.
Campbell Heating Co., E. K., Kansas City, Mo.
• Carrier Corp., Syracuse, N. Y.
Dallas Engineering Co., Inc., Dallas, Tex.
Drying Systems, Inc., Chicago, Ill.
Essick Mfg. Co., Los Angeles, Calif.
• Farr Co., Los Angeles, Calif.
Goetti Bros. Metal Prod. Co., Phoenix, Ariz.
Great National Air Conditioning Co., Dallas, Tex.
• Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
International Sales Co., San Francisco, Calif.
Martin Fan & Blower Co., Chicago, Ill.
Montag Stove & Furnace Works, Portland, Ore.
• Morey, Dan, Los Angeles, Calif. (mats for evaporative coolers)
Mountain States Equipment Co., Denver, Colo.
National Engineering & Mfg. Co., Kansas City, Mo.
Niagara Blower Co., New York, N. Y.
Palmer Mfg. Co., Phoenix, Ariz.
• Peerless of America, Inc., Chicago, Ill.
Pernot & Rich, Inc., Los Angeles, Calif.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Rhode Island Humidifier & Ventilating Co., Boston, Mass.
Royal Air Conditioning Equipment Co., Alhambra, Calif.
Schelm Bros., Inc., East Peoria, Ill.
• United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Western Blower Co., Seattle, Wash.
X L Refrigerating Co., Chicago, Ill.

UNITS, AIR CONDITIONING, SUMMER, ROOM TYPE, FLOOR CABINET, REMOTE COMPRESSOR OR COLD WATER, UNDER 3 TONS CAPACITY

Self contained blower, coil, filter unit for connection to remote compressor or cold water supply

• Airtemp, Div. of Chrysler Corp., Dayton, O.
American Coils Inc., Newark, N. J.
• Carrier Corp., Syracuse, N. Y.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Giant Mfg. Co., Council Bluffs, Ia.
Hastings Air Conditioning Co., Hastings, Neb.
• Ilg Electric Ventilating Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
• Kennard Corp., St. Louis, Mo.
King Ventilating Co., Owatonna, Minn.
• McQuay, Inc., Minneapolis, Minn.
Norwin Co., Freeport, Ill.
• Peerless of America, Inc., Chicago, Ill.
Premier Furnace Co., Dowagiac, Mich.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Scott-Newcomb, Inc., St. Louis, Mo.
Standard Computing Scale Co., The, Air Conditioning and Refrigeration Div., Detroit, Mich.
• Trane Co., The, La Crosse, Wis.
Unified Air Conditioner Co., Duluth, Minn.
• United States Air Conditioning Corp., Minneapolis, Minn.
Viking Mfg. Corp., Cleveland, O.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
• Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, SUMMER, ROOM TYPE, FLOOR CABINET, SELF CONTAINED COMPRESSOR, UNDER 3 HP

Self contained blower, coil, compressor, filter unit

• Airtemp, Div. of Chrysler Corp., Dayton, O.
• Carrier Corp., Syracuse, N. Y.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Ice Cooling Appliance Corp., Morrison, Ill. (Ice)
• Ilg Electric Ventilating Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
• Peerless of America, Inc., Chicago, Ill.
Philco Corp., Philadelphia, Pa.
Pleasantaire Corp., Washington, D. C.
Premier Furnace Co., Dowagiac, Mich.
Schelm Bros., Inc., East Peoria, Ill.
Scott-Newcomb, Inc., St. Louis, Mo.
York Corp., York, Pa.

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UNITS, AIR CONDITIONING, SUMMER, STORE TYPE, FLOOR CABINET, SELF CONTAINED COMPRESSOR, 3 HP AND OVER

Self contained blower, coil, compressor, filter unit with air discharge approximately 6 ft above floor

- Airtemp, Div. of Chrysler Corp., Dayton, O.
- Baker Ice Machine Co., Inc., Omaha, Neb.
- Brunner Mfg. Co., Utica, N. Y.
- Carrier Corp., Syracuse, N. Y.
- Clarage Fan Co., Kalamazoo, Mich.
- Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
- Forman Air Conditioning & Engrg. Co., New York, N. Y.
- Frick Co., Waynesboro, Pa.
- Frigidaire Div., General Motors Corp., Dayton, O.
- General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
- General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
- Governair Corp., Oklahoma City, Okla.
- Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- Nevinger Mfg. Co., Inc., Greenville, Ill.
- Peerless of America, Inc., Chicago, Ill.
- Refrigeration Appliances, Inc., Chicago, Ill.
- Scott-Newcomb, Inc., St. Louis, Mo.
- Trane Co., The, LaCrosse, Wis.
- United States Air Conditioning Corp., Minneapolis, Minn.
- Viking Mfg., Co., Cleveland, O.
- Vilter Mfg. Co., Milwaukee, Wis.
- Westinghouse Electric Corp., Springfield, Mass.
- Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
- X L Refrigerating Co., Chicago, Ill.
- York Corp., York, Pa.

UNITS, AIR CONDITIONING, WINTER, ROOM TYPE, FLOOR CABINET

Self contained blower, filter, heating coil, humidifier unit

- Air & Refrigeration Corp., New York, N. Y.
- Aladdin Heating Corp., Oakland, Calif.
- Auburn Burner Co., Auburn, Ind.
- Campbell Heating Co., Des Moines, Ia.
- Carrier Corp., Syracuse, N. Y.
- Clarage Fan Co., Kalamazoo, Mich.
- Fitzgibbons Boiler Co., Inc., New York, N. Y.
- General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
- Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
- Ilg Electric Ventilating Co., Chicago, Ill.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- Kehm Corp., The, Chicago, Ill.
- Kennard Corp., St. Louis, Mo.
- McQuay, Inc., Minneapolis, Minn.
- Peerless of America, Inc., Chicago, Ill.
- Refrigeration Economics Co., Inc., Canton, O.
- Reznor Mfg. Co., Mercer, Pa.
- Richmond Radiator Co., Gas Products Div., Uniontown, Pa.
- Somers, Inc., H. J., Detroit, Mich.
- Standard Computing Scale Co., The, Air Conditioning and Refrigeration Div., Detroit, Mich.
- Surface Combustion Corp., Toledo, O.
- Trane Co., The, La Crosse, Wis.
- Unified Air Conditioner Co., Duluth, Minn.
- United States Air Conditioning Corp., Minneapolis, Minn.
- Viking Mfg., Co., Cleveland, O.
- York Corp., York, Pa.

UNITS, AIR CONDITIONING, YEAR AROUND, ROOM TYPE, FLOOR CABINET

Self contained blower, cooling and heating coil, filter, humidifier unit for connection to remote compressor or cold water supply, and steam or hot water supply

- Air & Refrigeration Corp., New York, N. Y.
- Airtemp, Div. of Chrysler Corp., Dayton, O.
- American Coils, Inc., Newark, N. J.
- Beacon-Morris Corp., Boston, Mass. (Custom built)
- Carrier Corp., Syracuse, N. Y.
- Clarage Fan Co., Kalamazoo, Mich.
- Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
- General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
- General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
- Hastings Air Conditioning Co., Hastings, Neb.
- Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
- Ilg Electric Ventilating Co., Chicago, Ill.
- Jaden Mfg. Co., Hastings, Neb.
- Johnson Co., S. T., Oakland, Calif.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- Kelvinator Div., Nash-Kelvinator Corp., Detroit, Mich.
- Kennard Corp., St. Louis, Mo.
- Kramer Trenton Co., Trenton, N. J.
- Marlo Coil Co., St. Louis, Mo.
- McQuay, Inc., Minneapolis, Minn.
- Niagara Blower Co., New York, N. Y.
- Peerless of America, Inc., Chicago, Ill.
- Refrigeration Economics Co., Inc., Canton, O.
- Standard Computing Scale Co., The, Air Conditioning and Refrigeration Div., Detroit, Mich.
- Trane Co., The, La Crosse, Wis.
- Unified Air Conditioner Co., Duluth, Minn.
- York Corp., York, Pa.

UNITS, STERILIZING, AIR

- Rogers Diesel & Aircraft Corp., New York, N. Y.

UNITS, WINDOW VENTILATOR AND FILTER

- Airgard Mfg. Co., Chicago, Ill.
- American Air Conditioning Co., Detroit, Mich.
- Berger Mfg. Div., Republic Steel Corp., Canton, O.
- Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
- Ilg Electric Ventilating Co., Chicago, Ill.
- Kaiser Co., H. S., Chicago, Ill.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- Meier Electric & Machine Co., Indianapolis, Ind.
- Mellish & Murray Co., Chicago, Ill.
- Reed Unit-Fans, Inc., New Orleans, La.
- Reliable Sheet Metal Engineering Co., Chicago, Ill.
- Schwitzer-Cummins Co., Indianapolis, Ind.
- Somers, Inc., H. J., Detroit, Mich.
- Trade-Wind Motorfans, Inc., Los Angeles, Calif.
- Unified Air Conditioner Co., Duluth, Minn.
- Utility Appliance Corp., Los Angeles, Calif.
- Vita-Screen Ventilator Co., New York, N. Y.

UNIVERSAL JOINTS

See Joints, Universal, for Operating Valves

VACUUM CLEANERS FOR BOILERS

See Cleaners, Vacuum, for Boilers

VACUUM GAGES

See Gages, Indicating, Vacuum

VACUUM HEATING SYSTEMS

See Systems, Heating, Vacuum

VACUUM PUMPS

See Pumps, Vacuum

VACUUM RECORDERS

See Recorders, Pressure and Vacuum

VALVE OPERATORS

See Operators, Valve

VALVE RESEATERS

See Reseaters, Valve

VALVES, ANGLE

- Albright Equipment Co., Johnstown, Pa.
- Alloy Steel Products Co., Linden, N. J. (Stainless steel)
- American Brass Co., Waterbury, Conn.
- Automatic Temperature Control Co., Inc., Philadelphia, Pa.
- Belfield Co., H., Philadelphia, Pa.
- Belknap Mfg. Co., Bridgeport, Conn.
- Bordo Co., Inc., L. J., Glenside, Pa. (Plug)
- Capitol Brass Works, Div. of Bohn Aluminum & Brass Corp., Detroit, Mich.
- Central Brass Mfg. Co., Cleveland, O.
- Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
- Chase Brass & Copper Co., Waterbury, Conn.
- Cochrane Corp., Philadelphia, Pa.
- Crane Co., Chicago, Ill.
- Detroit Brass & Malleable Wks., Detroit, Mich.
- Edward Valve & Mfg. Co., Inc., East Chicago, Ind.
- Fairbanks Co., New York, N. Y.
- Farris Engineering Co., Palisades Park, N. J.
- Gorton Heating Corp., Cranford, N. J.
- Grinnell Co., Inc., Providence, R. I.
- Hancock Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
- Hasco Valve & Machine Co., Milwaukee, Wis.
- Homestead Valve Mfg. Co., Coraopolis, Pa.
- Imperial Brass Mfg. Co., Chicago, Ill.
- Jarecki Mfg. Co., Erie, Pa.
- Jenkins Bros., New York, N. Y.
- Kennedy Valve Mfg. Co., Elmira, N. Y.
- Kitson Co., Philadelphia, Pa.
- Klingerit, Inc., New York, N. Y.
- Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
- Lunkenheimer Co., Cincinnati, O.
- Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
- McAlear Mfg. Co., Chicago, Ill.
- Milwaukee Valve Co., Milwaukee, Wis.
- Mueller Brass Co., Port Huron, Mich.
- Northern Indiana Brass Co., Elkhart, Ind.
- Ohio Brass Co., Mansfield, O.
- Ohio Injector Co., Wadsworth, O.
- Ohio Pattern Wks. & Foundry Co., Cincinnati, O.
- O'Malley Valve Co., Edward, Chicago, Ill.
- Parker Appliance Co., Cleveland, O.
- Pittsburgh Valve & Fittings Corp., Barberton, O.
- Powell Co., Wm., Cincinnati, O.
- Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
- Sarcotherm Controls, Inc., New York, N. Y.
- Schutte & Koerting Co., Philadelphia, Pa.
- Scott Valve Mfg. Co., Detroit, Mich.
- Stockham Pipe Fittings Co., Birmingham, Ala.
- Strong, Carlisle & Hammond Co., Cleveland, O.
- Vogt Machine Co., Henry, Louisville, Ky.
- Walworth Co., New York, N. Y.
- Watson-Stillman Co., Roselle, N. J. (hydraulic service)
- White Flo-Matic Corp., Hoosick Falls, N. Y.
- Williams Valve Co., D. T., Cincinnati, O.

VALVES, BALANCING, RADIATOR, FOR FORCED HOT WATER HEATING SYSTEMS

- American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
- Hammond Brass Works, Hammond, Ind.

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Marsh Valve Co., Dunkirk, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
• Trane Co., The, LaCrosse, Wis.

VALVES, BLOW-OFF

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
Babcock & Wilcox Co., New York, N. Y.
Barrett Machine Co., N. S. Pittsburgh, Pa.
Bordo Co., Inc., L. J., Glenside, Pa.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cochrane Corp., Philadelphia, Pa.
• Crane Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Edward Valve & Mfg. Co., Inc., East Chicago, Ind.
Elliott Co., Jeannette, Pa.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., New York, N. Y.
Hancock Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Jarecki Mfg. Co., Erie, Pa.
• Jenkins Bros., New York, N. Y.
Keckley Co., O. C., Chicago, Ill.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
• McDonnell & Miller, Inc., Chicago, Ill.
Norgren Co., C. A., Denver, Colo.
Ohio Injector Co., Wadsworth, O.
O'Malley Valve Co., Edward, Chicago, Ill.
Parker Appliance Co., Cleveland, O.
Powell Co., Wm., Cincinnati, O.
Schade Valve Co., Philadelphia, Pa.
Strong, Carlisle & Hammond Co., Cleveland, O.
• Walworth Co., New York, N. Y.
• Yarnall-Waring Co., Philadelphia, Pa.

VALVES, CHECK

Aeroquip Corp., Jackson, Mich.
Albright Equipment Co., Johnstown, Pa.
Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Hard Rubber Co., New York, N. Y. (Hard rubber)
Barrett, Haentjens & Co., Hazleton, Pa.
Belfield Co., H., Philadelphia, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
Capitol Brass Works, Div. of Bohn Aluminum & Brass Corp., Detroit, Mich.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Detroit Brass & Malleable Wks., Detroit, Mich.
Durabla Mfg. Co., New York, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Edward Valve & Mfg. Co., Inc., East Chicago, Ind.
Electrol Mfg. Co., Passaic, N. J.
Fairbanks Co., New York, N. Y.
Foster Engineering Co., Newark, N. J.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
• Grinnell Co., Inc., Providence, R. I.
Hammond Brass Works, Hammond, Ind.
Hancock Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Harman Equipment Co., Los Angeles, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis.
• Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
• Jenkins Bros., New York, N. Y.
• Kennedy Valve Mfg. Co., Elmira, N. Y.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Mansfield & Green, Cleveland, O.
Milwaukee Valve Co., Milwaukee, Wis.
Mueller Co., Decatur, Ill.
• Mueller Brass Co., Port Huron, Mich.
Norgren Co., C. A., Denver, Colo.
Northern Indiana Brass Co., Elkhart, Ind.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Ohio Pattern Wks. & Foundry Co., Cincinnati, O.
O'Malley Valve Co., Edward, Chicago, Ill.
Parker Appliance Co., Cleveland, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Ruggles-Klingemann Mfg. Co., Salem, Mass. (Bleeder type)
Schutte & Koerting Co., Philadelphia, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Smolensky Valve Co., Inc., Bedford, O.
Stockham Pipe Fittings Co., Birmingham, Ala.
Stokes Rubber Co., Jos., Trenton, N. J. (Hard rubber)
Strong, Carlisle & Hammond Co., Cleveland, O.
Taco Heaters, Inc., New York, N. Y.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.
• Watson-Stillman Co., Roselle, N. J. (hydraulic service)
White Flo-Matic Corp., Hoosick Falls, N. Y.
Williams Gauge Co., Pittsburgh, Pa. (Noiseless)
Williams Valve Co., D. T., Cincinnati, O.

VALVES, COMPRESSOR

Cash Valve Mfg. Co., A. W., Decatur, Ill.
• Detroit Stamping Co., Detroit, Mich.
Durabla Mfg. Co., New York, N. Y.
Frick Co., Waynesboro, Pa.
• Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
• Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Ohio Injector Co., Wadsworth, O.
Q-P Mfg. Co., Needham Heights, Mass.
Voss Co., J. H. H., New York, N. Y.

VALVES, DIAPHRAGM

American Hard Rubber Co., New York, N. Y. (Rubber lined)
American Schaeffer & Budenberg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Atlas Valve Co., Inc., Newark, N. J.
Belfield Co., H., Philadelphia, Pa.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., Waterbury, Conn.
• Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Cooper Co., Clark, Palmyra, N. J.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Reading, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Engineering Co., Palisades Park, N. J.
• Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Foxboro Co. Foxboro, Mass.
• General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
• Grinnell Co., Providence, R. I.
• Hagan Corp., Pittsburgh, Pa.
• Henry Valve Co., Chicago, Ill.
• Illinois Engineering Co., Chicago, Ill.
• Johnson Service Co., Milwaukee, Wis.
Kainer & Co., Chicago, Ill.
• Kieley & Mueller, Inc., North Bergen, N. J.
Kitson Co., Philadelphia, Pa.
Klipfel Mfg. Co., Chicago, Ill.
Leslie Co., Lyndhurst, N. J.
Mason-Neilan Regulator Co., Boston, Mass.
• McAlear Mfg. Co., Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Mueller Brass Co., Port Huron, Mich.
Mueller Co., Decatur, Ill.
Muelles Steam Specialty Co., Inc., Long Island City, N. Y.
Norgren Co., C. A., Denver, Colo.
Northern Indiana Brass Co., Elkhart, Ind.
Parks-Cramer Co., Fitchburg, Mass.
Powell Co., Wm., Cincinnati, O.
• Powers Regulator Co., Chicago, Ill.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Staples & Pfeiffer, San Francisco, Calif.
Strong, Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., Cleveland, O.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
• Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Peru, Ind.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
• White-Rodgers Electric Co., St. Louis, Mo.

VALVES, FIRE PROTECTION, SPRINKLER SYSTEM CONTROL

• Barber-Colman Co., Rockford, Ill.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., New York, N. Y.
Hodgman Mfg. Co., Taunton, Mass.
Ohio Injector Co., Wadsworth, O.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwood Sprinkler Co., Worcester, Mass.

VALVES, FLOAT

Albright Equipment Co., Johnstown, Pa.
• Alco Valve Co., St. Louis, Mo.
American Hard Rubber Co., New York, N. Y. (Hard rubber)
Atlas Valve Co., Inc., Newark, N. J.
• Automatic Products Co., Milwaukee, Wis. (Oil)
Beckett & Co., Thomas, Dallas, Tex.
Belfield Co., H., Philadelphia, Pa.
Boylston Steam Specialty Co., Chicago, Ill.

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Caldwell Co., W. E., Louisville, Ky.
• Cash Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Cleveland Humidifier Co., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Reading, Pa.
• Detroit Lubricator Co., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Farris Engineering Co., Palisades Park, N. J.
• Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Frick Co., Waynesboro, Pa.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
• Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
• Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Chicago, Ill.
Locke Regulator Co., Salem, Mass.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
• Maid-O'-Mist, Inc., Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
• McAlear Mfg. Co., Chicago, Ill.
• McDonnell & Miller, Inc., Chicago, Ill.
Monash-Younker Co., Chicago, Ill.
Morey, Dan, Los Angeles, Calif.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
• Phillips & Co., H. A., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
• Schaub Engineering Co., Fred H., Chicago, Ill.
Schutte & Koerting Co., Philadelphia, Pa.
Skuttle Mfg. Co., Detroit, Mich.
Spence Engineering Co., Inc., Walden, N. Y.
Stickle Steam Specialties Co., Indianapolis, Ind.
Swartwout Co., Cleveland, O.
Viking Air Conditioning Corp., Cleveland, O.
Voss Co., J. H. H., New York, N. Y.
Watts Regulator Co., Lawrence, Mass.

VALVES, FLOW CONTROL, FOR HOT WATER HEATING SYSTEMS

• Bell & Gossett Co., Morton Grove, Ill.
Hammel-Dahl Co., Providence, R. I.
• Illinois Engineering Co., Chicago, Ill.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Taco Heaters, Inc., New York, N. Y.
• Thrush & Co., H. A., Peru, Ind.
• Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Peru, Ind.

VALVES, FORGED STEEL

Albright Equipment Co., Johnstown, Pa.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cochrane Corp., Philadelphia, Pa.
• Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Edward Valve & Mfg. Co., Inc., East Chicago, Ind.
Hancock Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
• Henry Valve Co., Chicago, Ill.
O'Malley Valve Co., Edward, Chicago, Ill.
Parker Appliance Co., Cleveland, O.
R-S Products Corp., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Steel Improvement & Forge Co., Cleveland, O.
Strong, Carlisle & Hammond Co., Cleveland, O.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.
• Watson-Stillman Co., Roselle, N. J.

VALVES, GATE, ALLOY

Alloy Steel Products Co., Linden, N. J.
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
• Crane Co., Chicago, Ill.
Edward Valve & Mfg. Co., Inc., East Chicago, Ind.
Hasco Valve & Machine Co., Milwaukee, Wis.
• Jenkins Bros., New York, N. Y.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
• Walworth Co., New York, N. Y.
• Watson-Stillman Co., Roselle, N. J.

VALVES, GATE, BRASS AND BRONZE

• American Brass Co., Waterbury, Conn.
Belknap Mfg. Co., Bridgeport, Conn.
Bordo Co., Inc., L. J., Glenside, Pa.
Capitol Brass Works, Div. of Bohn Aluminum Brass Corp., Detroit, Mich.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Detroit Brass & Malleable Wks., Detroit, Mich.
Eddy Valve Co., Waterford, N. Y.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., New York, N. Y.
Hammond Brass Wks., Hammond, Ind.
Hancock Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Jarecki Mfg. Co., Erie, Pa.
• Jenkins Bros., New York, N. Y.
• Kennedy Valve Mfg. Co., Elmira, N. Y.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Milwaukee Valve Co., Milwaukee, Wis.
Northern Indiana Brass Co., Elkhart, Ind.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Ohio Pattern Wks. & Foundry Co., Cincinnati, O.
Ostlind Valve, Inc., Portland, Ore.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
R-S Products Corp., Philadelphia, Pa.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Schaible Co., The, Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
Stockham Pipe Fittings Co., Birmingham, Ala.
• Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, GATE, IRON BODY

Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., New York, N. Y.
Hancock Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
• Jenkins Bros., New York, N. Y.
• Kennedy Valve Mfg. Co., Elmira, N. Y.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Milwaukee Valve Co., Milwaukee, Wis.
• National Radiator Co., The, Johnstown, Pa.
Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve & Fittings Co., Barberton, O.
Powell Co., Wm., Cincinnati, O.
R-S Products Corp., Philadelphia, Pa.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Scott Valve Mfg. Co., Detroit, Mich.
Semet-Solvay Engineering Corp., New York, N. Y.
• Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, GATE, MALLEABLE IRON

• Crane Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.

VALVES, GATE, STEEL

American Hard Rubber Co., New York, N. Y.
Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cooper Alloy Foundry Co., Hillside, N. J.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Edward Valve & Mfg. Co., Inc., East Chicago, Ind.
Everlasting Valve Co., Jersey City, N. J.
Hancock Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
• Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
• National Radiator Co., The, Johnstown, Pa.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
R-S Products Corp., Philadelphia, Pa.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.
• Watson-Stillman Co., Roselle, N. J.

VALVES, GLOBE, ALLOY

Alloy Steel Products Co., Linden, N. J.
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Cooper Alloy Foundry Co., Hillside, N. J.
• Crane Co., Chicago, Ill.

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Hasco Valve & Machine Co., Milwaukee, Wis
• Jenkins Bros., New York, N. Y.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
• Walworth Co., New York, N. Y.

VALVES, GLOBE, BRASS AND BRONZE

• American Brass Co., Waterbury, Conn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Belfield Co., H., Philadelphia, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
Bowser, Inc., Fort Wayne, Ind.
California Brass Mfg. Co., Los Angeles, Calif.
Capitol Brass Works, Div. of Bohn Aluminum & Brass Corp., Detroit, Mich.
Central Valve Mfg. Co., Chicago, Ill.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
Fairbanks Co., New York, N. Y.
• Grinnell Co., Inc., Providence, R. I.
Hammond Brass Wks., Hammond, Ind.
Hancock Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Jarecki Mfg. Co., Erie, Pa.
• Jenkins Bros., New York, N. Y.
• Kennedy Valve Mfg. Co., Elmira, N. Y.
Klingerit, Inc., New York, N. Y.
Lunkenheimer Co., Cincinnati, O.
Milwaukee Valve Co., Milwaukee, Wis.
Newman Brothers, Inc., Cincinnati, O.
Northern Indiana Brass Co., Elkhart, Ind
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Ohio Pattern Wks. & Foundry Co., Cincinnati, O
O'Malley Valve Co., Edward, Chicago, Ill.
Ostlind Valve, Inc., Portland, Ore
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa
Scott Valve Mfg. Co., Detroit, Mich.
Stockham Pipe Fittings Co., Birmingham, Ala.
Strong, Carlisle & Hammond Co., Cleveland, O.
• Walworth Co., New York, N. Y.
• Watson-Stillman Co., Roselle, N. J. (hydraulic service)
White Flo-Matic Corp., Hoosick Falls, N. Y.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, GLOBE, IRON BODY

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Belfield Co., H., Philadelphia, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Cyrus Shank Co., Chicago, Ill.
Edward Valve & Mfg. Co., Inc., East Chicago, Ind
Fairbanks Co., New York, N. Y.
Frick Co., Waynesboro, Pa.
• Grinnell Co., Inc., Providence, R. I.
Hancock Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
• Henry Valve Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
• Jenkins Bros., New York, N. Y.
• Kennedy Valve Mfg. Co., Elmira, N. Y.
Klingerit, Inc., New York, N. Y.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Shank Co., Cyrus, Chicago, Ill.
• Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, GLOBE, MALLEABLE IRON

• Crane Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.

VALVES, GLOBE, STEEL

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Belfield Co., H., Philadelphia, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cooper Alloy Foundry Co., Hillside, N. J.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Edward Valve & Mfg. Co., Inc., East Chicago, Ind.
Hancock Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
• Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Kitson Co., Philadelphia, Pa.
Klingerit, Inc., New York, N. Y.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Ohio Injector Co., Wadsworth, O.
Ostlind Valve, Inc., Portland, Ore.
Parker Appliance Co., Cleveland, O.
Powell Co., Wm., Cincinnati, O.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Strong, Carlisle & Hammond Co., Cleveland, O.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.
• Watson-Stillman Co., Roselle, N. J.

VALVES, LINED

American Hard Rubber Co., New York, N. Y. (Hard rubber lined)
American Smelting & Refining Co., New York, N. Y.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Goodrich Co., B. F., Akron, O. (Rubber lined)
• Grinnell Co., Inc., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (Rubber)
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead or tin)
• McAlear Mfg. Co., Chicago, Ill.
National Lead Co., New York, N. Y. (Lead)
Northern Indiana Brass Co., Elkhart, Ind. (Tinned)
Resisto Pipe & Valve Co., East Cambridge, Mass. (Lead)
Schutte & Koerting Co., Philadelphia, Pa. (Lead)
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.

VALVES, MIXING, HOT AND COLD WATER

• Carrier Corp., Syracuse, N. Y.
• Crane Co., Chicago, Ill.
• Dole Valve Co., The, Chicago, Ill.
• Fulton Sylphon Co., Knoxville, Tenn.
• General Fittings Co., Providence, R. I.
Holby Valve Co., New York, N. Y.
Lawler Automatic Controls, Mount Vernon, N. Y.
• McAlear Mfg. Co., Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Thermo-Mix, Inc., Long Island City, N. Y.
Watts Regulator Co., Lawrence, Mass.

VALVES, MIXING, STEAM AND WATER

Central Brass Mfg. Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
• Fulton Sylphon Co., Knoxville, Tenn.
• General Fittings Co., Providence, R. I.
Hammel-Dahl Co., Providence, R. I.
• Johnson Service Co., Milwaukee, Wis.
Leonard Valve Co., Providence, R. I.
• Powers Regulator Co., Chicago, Ill.
• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Vapor Car Heating Co., Inc., Chicago, Ill.

VALVES, MOTOR OPERATED

• Alco Valve Co., St. Louis, Mo.
Armstrong Heat Control Co., Portland, Ore.
• Autempco Corp., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
• Barber-Colman Co., Rockford, Ill.
• Bell & Gossett Co., Morton Grove, Ill.
Bristol Co., Waterbury, Conn.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Edward Valve & Mfg. Co., Inc., East Chicago, Ind.
Foxboro Co., Foxboro, Mass.
• General Controls Co., Glendale, Calif.
General Electric Co., Schenectady, N. Y.
Hasco Valve & Machine Co., Milwaukee, Wis.
Homestead Valve Mfg. Co., Coraopolis, Pa.
• Illinois Engineering Co., Chicago, Ill.
• Jenkins Bros., New York, N. Y.
• Kennedy Valve Mfg. Co., Elmira, N. Y.
• Kieley & Mueller, Inc., North Bergen, N. J.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Mason-Neilan Regulator Co., Boston, Mass.
• Mercoid Corp., Chicago, Ill.
Merco-Nordstrom Valve Co., Pittsburgh, Pa.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Powell Co., Wm., Cincinnati, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
R-S Products Corp., Philadelphia, Pa.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Sarcotherm Controls, Inc., New York, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.

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Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Tallmadge & Co., Webster, East Orange, N. J.
• Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Vapor Car Heating Co., Inc., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.
• Webster & Co., Warren, Camden, N. J.
Webster Tallmadge & Co., East Orange, N. J.

VALVES, NEEDLE

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
• Automatic Products Co., Milwaukee, Wis. (Oil)
Beckett & Co., Thomas, Dallas, Tex.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Cyrus Shank Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Detroit Brass & Malleable Wks., Detroit, Mich.
• Detroit Lubricator Co., Detroit, Mich.
Edward Valve & Mfg. Co., Inc., East Chicago, Ind.
Grove Regulator Co., Oakland, Calif.
Hancock Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
• Jenkins Bros., New York, N. Y.
• Kennedy Valve Mfg. Co., Elmira, N. Y.
Lunkenheimer Co., Cincinnati, O.
• Maid-O'-Mist, Inc., Chicago, Ill.
• McAlear Mfg. Co., Chicago, Ill.
• McDonnell & Miller, Inc., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Norgren Co., C. A., Denver, Colo.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Parker Appliance Co., Cleveland, O.
Powell Co., Wm., Cincinnati, O.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
• Schaub Engineering Co., Fred H., Chicago, Ill.
Shank Co., Cyrus, Chicago, Ill.
• Taylor Instrument Companies, Rochester, N. Y.
• Walworth Co., New York, N. Y.
• Watson-Stillman Co., Roselle, N. J. (Hydraulic service)
Webster Electric Co., Racine, Wis. (Pressure regulating valve for oil burners)
Williams Valve Co., D. T., Cincinnati, O.

VALVES, PLASTIC

Haveg Corp., Newark, Del.

VALVES, PLUG

Alten's Foundry & Machine Works, Lancaster, O.
American Car & Foundry Co., New York, N. Y.
Andale Co., Philadelphia, Pa.
Barrett, Haentjens & Co., Hazleton, Pa.
Barrett Machine Co., N. S. Pittsburgh, Pa.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
• Crane Co., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Eddy Valve Co., Waterford, N. Y.
Edward Valve & Mfg. Co., Inc., East Chicago, Ind.
Fairbanks Co., New York, N. Y.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Hamer Oil Tool Co., Long Beach, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
• Jenkins Bros., New York, N. Y.
• Kennedy Valve Mfg. Co., Elmira, N. Y.
Kitson Co., Philadelphia, Pa.
Klingerit, Inc., New York, N. Y.
Knight, Maurice A., Akron, O. (Stoneware)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Merco-Nordstrom Valve Co., Pittsburgh, Pa. (Lubricated)
Mueller Co., Decatur, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Northern Indiana Brass Co., Elkhart, Ind.
Ohio Injector Co., Wadsworth, O.
O'Malley Valve Co., Edward, Chicago, Ill.
Ostlind Valve, Inc., Portland, Ore.
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Brass Mfg. Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Stockham Pipe Fittings Co., Birmingham, Ala.
• Taylor Instrument Companies, Rochester, N. Y.
• Walworth Co., New York, N. Y.
White Flo-Matic Corp., Hoosick Falls, N. Y.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, PRESSURE REDUCING AND REGULATING, AIR AND GAS

Atlas Valve Co., Inc., Newark, N. J.
Belfield Co., H., Philadelphia, Pa.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
• Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Reading, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Engineering Co., Palisades Park, N. J.
• Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
• Fulton Sylphon Co., Knoxville, Tenn.
• General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
• Hagan Corp., Pittsburgh, Pa.
Hubbell Corp., Chicago, Ill.
• Illinois Engineering Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
• Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Chicago, Ill.
Leslie Co., Lyndhurst, N. J.
Liquid Carbonic Corp., The, Chicago, Ill.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
• McAlear Mfg. Co., Chicago, Ill.
Modern Engineering Co., St. Louis, Mo.
Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Norgren Co., C. A., Denver, Colo.
Northern Equipment Co., Erie, Pa.
• Powers Regulator Co., Chicago, Ill.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Strong, Carlisle & Hammond Co., Cleveland, O.
Sullivan Valve & Engineering Co., Butte, Mont.
Swartwout Co., Cleveland, O.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Tallmadge & Co., Webster, East Orange, N. J.
• Taylor Instrument Companies, Rochester, N. Y.
• Thrush & Co., H. A., Peru, Ind.
Torchweld Equipment Div., National Cylinder Gas Co., Chicago, Ill.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Peru, Ind.
Tryco Products, Inc., Westfield, Mass.
Voss Co., J. H. H., New York, N. Y.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Webster Tallmadge & Co., East Orange, N. J.
White Flo-Matic Corp., Hoosick Falls, N. Y.

VALVES, PRESSURE REDUCING AND REGULATING, HOT WATER

• Bell & Gossett Co., Morton Grove, Ill.
• Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Reading, Pa.
• Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
• Illinois Engineering Co., Chicago, Ill.
Kainer & Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
• Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Chicago, Ill.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
• McAlear Mfg. Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong, Carlisle & Hammond Co., Cleveland, O.
Tagliabue Div., C. J., Portland Products Corp., Brooklyn, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
• Thrush & Co., H. A., Peru, Ind.
• Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Peru, Ind.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.

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VALVES, PRESSURE REDUCING AND REGULATING, STEAM

• American District Steam Co., North Tonawanda, N. Y.
Atlas Valve Co., Inc., Newark, N. J.
Bailey Meter Co., Cleveland, O.
Belfield Co., H., Philadelphia, Pa.
Bovlston Steam Specialty Co., Chicago, Ill.
• Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Reading, Pa.
• Dunham Co., C. A., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Engineering Co., Palisades Park, N. J.
• Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
• Fulton Sylphon Co., The, Knoxville, Tenn.
• General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
• Hagan Corp., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
Hubbell Corp., Chicago, Ill.
• Illinois Engineering Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
• Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Chicago, Ill.
Leslie Co., Lynhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
• McAlear Mfg. Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Northern Equipment Co., Erie, Pa.
• Powers Regulator Co., Chicago, Ill.
Republic Flow Meters Co., Chicago, Ill.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
• Schaub Engineering Co., Fred H., Chicago, Ill.
Schutte & Koerting Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong, Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., Cleveland, O.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Tallmadge & Co., Webster, East Orange, N. J.
• Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Vapor Car Heating Co., Inc., Chicago, Ill.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Webster Tallmadge & Co., East Orange, N. J.
White Flo-Matic Corp., Hoosick Falls, N. Y.

VALVES, PUMP

Anchor Packing Co., Philadelphia, Pa.
Berger Bros. Co., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Dick Co., Inc., R. & J., Passaic, N. J.
Durabla Mfg. Co., New York, N. Y.
Garlock Packing Co., Palmyra, N. Y.
Goodrich Co., B. F., Akron, O.
Quaker Rubber Corp., Philadelphia, Pa.
Williams Gauge Co., Pittsburgh, Pa.

VALVES, RADIATOR, AIR

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Anderson Products, Inc., Cambridge, Mass.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
• Crane Co., Chicago, Ill.
• Dole Valve Co., The, Chicago, Ill.
Gorton Heating Corp., Cranford, N. J.
• Hoffman Specialty Co., Indianapolis, Ind.
Jarecki Mfg. Co., Erie, Pa.
• Jenkins Bros, New York, N. Y.
Keeney Mfg. Co., Newington, Conn.
Little Mfg. Co., M. S., Hartford, Conn.
• Maid-O'-Mist, Inc., Chicago, Ill. (Humidifying)
Majot Automatic Machine Co., Inc., East Orange, N. J.
Marsh Corp., Jas. P., Chicago, Ill.
• McAlear Mfg. Co., Chicago, Ill.
New York Air Valve Corp., New York, N. Y.
Slater Mfg. Co., Wakefield, Mass.
Sullivan Valve & Engineering Co., Butte, Mont.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, ELECTRIC

• Autempco Corp., New York, N. Y.
• Barber-Colman Co., Rockford, Ill.
Electric Valve Mfg. Co., Inc., New York, N. Y.
• Fulton Sylphon Co., Knoxville, Tenn.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Sarcotherm Controls, Inc., New York, N. Y.
Vapor Car Heating Co., Inc., Chicago, Ill.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, PNEUMATIC

American Schaeffer & Budenburg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
• Johnson Service Co., Milwaukee, Wis.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Powers Regulator Co., Chicago, Ill.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, SELF-CONTAINED

American Schaeffer & Budenburg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
• Autempco Corp., New York, N. Y.
Edison, Inc., Thos. A., Instrument Div., West Orange, N. J.
• Fulton Sylphon Co., Knoxville, Tenn.
Lawler Automatic Controls, Mount Vernon, N. Y.
Majot Automatic Machine Co., Inc., East Orange, N. J.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Powers Regulator Co., Chicago, Ill.
• Sterling, Inc., Milwaukee, Wis.
Tallmadge & Co., Webster, East Orange, N. J.
• Trane Co., The, LaCrosse, Wis.
Webster Tallmadge & Co., East Orange, N. J.

VALVES, RADIATOR, ORIFICE

• American District Steam Co., North Tonawanda, N. Y.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
• Autempco Corp., New York, N. Y.
Barnes & Jones, Inc., Boston, Mass.
• Dunham Co., C. A., Chicago, Ill.
• Grinnell Co., Inc., Providence, R. I.
• Haines & Co., William S., Philadelphia, Pa.
• Illinois Engineering Co., Chicago, Ill.
Marsh Valve Co., Dunkirk, N. Y.
New York Air Valve Corp., New York, N. Y.
• Sarco Co., Inc., New York, N. Y.
• Sarcotherm Controls, Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
• Trane Co., The, LaCrosse, Wis.
• Webster & Co., Warren, Camden, N. J.

VALVES, RADIATOR, STEAM AND HOT WATER, HAND

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Belfield Co., H., Philadelphia, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
• Bishop & Babcock Mfg. Co., Cleveland, O.
Capitol Brass Works, Div. of Bohn Aluminum & Brass Corp., Detroit, Mich.
Chase Brass & Copper Co., Waterbury, Conn.
• Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
• Dunham Co., C. A., Chicago, Ill.
Fairbanks Co., New York, N. Y.
Gorton Heating Corp., Cranford, N. J.
• Grinnell Co., Inc., Providence, R. I.
• Haines & Co., William S., Philadelphia, Pa.
Hammond Brass Wks., Hammond, Ind.
• Hoffman Specialty Co., Indianapolis, Ind.
• Illinois Engineering Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
• Jenkins Bros., New York, N. Y.
• Kennedy Valve Mfg. Co., Elmira, N. Y.
Lunkenheimer Co., Cincinnati, O.
Marsh Corp., Jas. P., Chicago, Ill.
Marsh Valve Co., Dunkirk, N. Y.
• McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Northern Indiana Brass Co., Elkhart, Ind.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
• Sterling, Inc., Milwaukee, Wis.
• Trane Co., The, LaCrosse, Wis.
• Walworth Co., New York, N. Y.
• Webster & Co., Warren, Camden, N. J.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, RADIATOR, STEAM AND HOT WATER, MODULATING

• American District Steam Co., North Tonawanda, N. Y.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Barnes & Jones, Inc., Boston, Mass.
• Bishop & Babcock Mfg. Co., Cleveland, O.
Cashin Co., W. D., Boston, Mass.
• Crane Co., Chicago, Ill.
Cryer Trap & Valve Co., Inc., New York, N. Y.
• Dunham Co., C. A., Chicago, Ill.
• Fulton Sylphon Co., Knoxville, Tenn.
Gorton Heating Corp., Cranford, N. J.
• Haines & Co., William S., Philadelphia, Pa.
• Hoffman Specialty Co., Indianapolis, Ind.
• Illinois Engineering Co., Chicago, Ill.

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Jenkins Bros., New York, N. Y.
Marsh Corp., Jas. P., Chicago, Ill.
Marsh Valve Co., Dunkirk, N. Y.
● McAlear Mfg. Co., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mouat Vapor Heating Co., The, Cleveland, O.
Ohio Brass Co., Mansfield, O.
● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
● Sterling, Inc., Milwaukee, Wis.
Tallmadge & Co., Webster, East Orange, N. J.
● Trane Co., The, LaCrosse, Wis.
Vapor Specialty Co., New York, N. Y.
● Webster & Co., Warren, Camden, N. J.
Webster Tallmadge & Co., East Orange, N. J.

VALVES, REFRIGERATION (ANGLE, CHECK, GATE, GLOBE, NEEDLE, RELIEF)

● Baker Ice Machine Co., Inc., Omaha, Neb.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Central Brass Mfg. Co., Cleveland, O.
● Crane Co., Chicago, Ill.
Cyrus Shank Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
● Detroit Stamping Co., Detroit, Mich.
Frick Co., Waynesboro, Pa.
● Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
● Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
● Mueller Brass Co., Port Huron, Mich.
Parker Appliance Co., The, Cleveland, O.
● Peerless of America, Inc., Chicago, Ill.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Shank Co., Cyrus, Chicago, Ill.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Triumph Ice Machine Co., Cincinnati, O.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Weatherhead Co., Cleveland, O.
● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

VALVES, REFRIGERATION, BACK PRESSURE

● Alco Valve Co., St. Louis, Mo.
Burrows Mfg. Co., F. A., York, Pa.
● Cash Co., A. W., Decatur, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
● Electrimatic, Chicago, Ill.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
Hubbell Corp., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
● Mueller Brass Co., Port Huron, Mich.
Temprite Products Corp., Detroit, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.

VALVES, REFRIGERATION, EXPANSION, CONSTANT PRESSURE

● Alco Valve Co., St. Louis, Mo.
● Automatic Products Co., Milwaukee, Wis.
● Baker Ice Machine Co., Inc., Omaha, Neb.
● Cash Co., A. W., Decatur, Ill.
Consolidated Safety Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● Detroit Lubricator Co., Detroit, Mich.
Foster Engineering Co., Newark, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
Hubbell Corp., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Mayson Mfg. Co., Inc., Detroit, Mich.
Milwaukee Gas Specialty Co., Milwaukee, Wis.
● Peerless of America, Inc., Chicago, Ill.
● Tenney Engineering, Inc., Newark, N. J.
Vilter Mfg. Co., Milwaukee, Wis.
X L Refrigerating Co., Chicago, Ill.

VALVES, REFRIGERATION, EXPANSION, THERMOSTATIC

● Alco Valve Co., St. Louis, Mo.
● Automatic Products Co., Milwaukee, Wis.
● Detroit Lubricator Co., Detroit, Mich.
Frigidaire Div., General Motors Corp., Dayton, O.
● General Controls Co., Glendale, Calif.
Mayson Mfg. Co., Inc., Detroit, Mich.
Milwaukee Gas Specialty Co., Milwaukee, Wis.
● Peerless of America, Inc., Chicago, Ill.
● Sporlan Valve Co., St. Louis, Mo.
● Tenney Engineering, Inc., Newark, N. J.
X L Refrigerating Co., Chicago, Ill.

VALVES, REFRIGERATION, FLOAT, HIGH PRESSURE

● Alco Valve Co., St. Louis, Mo.
American Injector Co., Detroit, Mich.
Foster Engineering Co., Newark, N. J.
Frick Co., Waynesboro, Pa.
Hubbell Corp., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
● Mercoid Corp., Chicago, Ill.
● Phillips & Co., H. A., Chicago, Ill.
● Schaub Engineering Co., Fred H., Chicago, Ill.
Temprite Products Corp., Detroit, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Voss Co., J. H. H., New York, N. Y.
Weatherhead Co., Cleveland, O.
● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

VALVES, REFRIGERATION, FLOAT, HIGH PRESSURE AND LOW PRESSURE

Vilter Mfg. Co., Milwaukee, Wis.

VALVES, REFRIGERATION, LIQUID CONTROL, FLOAT PILOTED

● Phillips & Co., H. A., Chicago, Ill.

VALVES, REFRIGERATION, MAGNETIC STOP

● Alco Valve Co., St. Louis, Mo.
● Automatic Products Co., Milwaukee, Wis.
Automatic Switch Co., New York, N. Y.
● Detroit Lubricator Co., Detroit, Mich.
Electric Valve Mfg. Co., Inc., New York, N. Y.
● Electrimatic, Chicago, Ill.
Farris Engineering Co., Palisades Park, N. J.
Frick Co., Waynesboro, Pa.
● General Controls Co., Glendale, Calif.
● Henry Valve Co., Chicago, Ill.
Hubbell Corp., Chicago, Ill.
● Mercoid Corp., Chicago, Ill.
● Penn Electric Switch Co., Goshen, Ind.

VALVES, REFRIGERATION, WATER REGULATING, PRESSURE OR TEMPERATURE ACTUATED

American Injector Co., Detroit, Mich.
Art Valve Co., Chicago, Ill.
● Automatic Products Co., Milwaukee, Wis.
● Cash Co., A. W., Decatur, Ill.
Cyrus Shank Co., Chicago, Ill.
● Electrimatic, Chicago, Ill.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
● Kieley & Mueller, Inc., North Bergen, N. J.
Hubbell Corp., Chicago, Ill.
● Mercoid Corp., Chicago, Ill.
Mueller Co., Decatur, Ill.
● Penn Electric Switch Co., Goshen, Ind.
Perfection Refrigeration Parts Co., Harvey, Ill.
● Sarco Co., Inc., New York, N. Y.
Shank Co., Cyrus, Chicago, Ill.
Spence Engineering Co., Inc., Walden, N. Y.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.

VALVES, RELIEF, HOT WATER, COMBINED PRESSURE AND TEMPERATURE OPERATED

Beaton & Cadwell Mfg. Co., New Britain, Conn.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
● Crane Co., Chicago, Ill.
Farris Engineering Co., Palisades Park, N. J.
● Fisher Governor Co., Marshalltown, Ia.
Kainer & Co., Chicago, Ill.
Kitson Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Patrol Valve Co., The, Cleveland, O.
Spencer Thermostat Co., Attleboro, Mass.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, La Crosse, Wis.
Watts Regulator Co., Lawrence, Mass.

VALVES, RELIEF, HOT WATER, PRESSURE OPERATED

Ashton Valve Co., Cambridge, Mass.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Consolidated Safety Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
Eddy Valve Co., Waterford, N. Y.
Edward Valve & Mfg. Co., Inc., East Chicago, Ind.
Farris Engineering Co., Palisades Park, N. J.
● Fisher Governor Co., Marshalltown, Ia.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
Kitson Co., Philadelphia, Pa.
Klipfel Mfg. Co., Chicago, Ill.

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Kunkle Valve Co., Ft. Wayne, Ind.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
• Maid-O'-Mist, Inc., Chicago, Ill.
• McAlear Mfg. Co., Chicago, Ill.
• McDonnell & Miller, Inc., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Neptune Meter Co., New York, N. Y.
Parker Appliance Co., The, Cleveland, O.
Patrol Valve Co., The, Cleveland, O.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Spencer Thermostat Co., Attleboro, Mass.
Staples & Pfeiffer, San Francisco, Calif.
Sullivan Valve & Engineering Co., Butte, Mont.
Swartwout Co., Cleveland, O.
Taco Heaters, Inc., New York, N. Y.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
• Thrush & Co., H. A., Peru, Ind.
• Trane Co., The, LaCrosse, Wis.
Triplex Heating Specialty Co., Peru, Ind.
Tryco Products, Inc., Westfield, Mass.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.

VALVES, RELIEF, HOT WATER, PRESSURE OPERATED, SELF-FILLING

Beaton & Cadwell Mfg. Co., New Britain, Conn.
• Bell & Gossett Co., Morton Grove, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
• Crane Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
• Kieley & Mueller, Inc., North Bergen, N. J.
Mueller Co., Decatur, Ill.
• Thrush & Co., H. A., Peru, Ind.
Watts Regulator Co., Lawrence, Mass.

VALVES, RELIEF, OIL

Andale Co., Philadelphia, Pa.
Ashton Valve Co., Cambridge, Mass.
• Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Consolidated Safety Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Farris Engineering Co., Palisades Park, N. J.
• Fisher Governor Co., Marshalltown, Ia.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Hammel-Dahl Co., Providence, R. I.
Keckley Co., O. C., Chicago, Ill.
• Kieley & Mueller, Inc., North Bergen, N. J.
Kunkle Valve Co., Ft. Wayne, Ind.
Locke Regulator Co., Salem, Mass.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Milwaukee Valve Co., Milwaukee, Wis.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Parker Appliance Co., The, Cleveland, O.
Scott Valve Mfg. Co., Detroit, Mich.
Watson & McDaniel Co., Philadelphia, Pa.

VALVES, SADDLE

Imperial Brass Mfg. Co., Chicago, Ill.
• Maid-O'-Mist, Inc., Chicago, Ill.
Ohio Injector Co., Wadsworth, O.
• Walworth Co., New York, N. Y.

VALVES, SAFETY, STEAM

Ashton Valve Co., Cambridge, Mass.
Capitol Brass Works, Div. of Bohn Aluminum & Brass Corp., Detroit, Mich.
Consolidated Safety Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
• Crane Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Engineering Co., Palisades Park, N. J.
Foster Engineering Co., Newark, N. J.
• Kieley & Mueller, Inc., North Bergen, N. J.
Kunkle Valve Co., Ft. Wayne, Ind.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Powell Co., Wm., Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
• Walworth Co., New York, N. Y.

VALVES, SOLDER JOINT

• American Brass Co., Waterbury, Conn.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
• Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Fairbanks Co., New York, N. Y. (Silver braze joints)
Hammond Brass Works, Hammond, Ind.
Imperial Brass Mfg. Co., Chicago, Ill.
• Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
• Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
• Walworth Co., New York, N. Y. (Brazed)
Weatherhead Co., Cleveland, O.

VALVES, SOLENOID

Albright Equipment Co., Johnstown, Pa.
• Alco Valve Co., St. Louis, Mo.
• Autempco Corp., New York, N. Y.
• Automatic Products Co., Milwaukee, Wis.
Automatic Switch Co., New York, N. Y.
• Barber-Colman Co., Rockford, Ill.
Belfield Co., H., Philadelphia, Pa.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
• Detroit Lubricator Co., Detroit, Mich.
Electric Valve Mfg. Co., Inc., New York, N. Y.
• Electrimatic, Chicago, Ill.
Frick Co., Waynesboro, Pa.
• General Controls Co., Glendale, Calif.
General Electric Co., Schenectady, N. Y.
General Sales & Products Co., Cohoes, N. Y.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
• Henry Valve Co., Chicago, Ill.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Hubbell Corp., Chicago, Ill.
Hunt & Son, C. B., Salem, O.
Keckley Co., O. C., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
• McDonnell & Miller, Inc., Chicago, Ill.
Milwaukee Gas Specialty Co., Milwaukee, Wis.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Parker Appliance Co., The, Cleveland, O.
Payne Furnace & Supply Co., Inc., Beverly Hills, Calif.
• Penn Electric Switch Co., Goshen, Ind.
Pfening Co., Fred D., Columbus, O. (1" water and steam)
R-S Products Corp., Philadelphia, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
• Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
• Sporlan Valve Co., St. Louis, Mo.
Square D Co., Detroit, Mich.
Supreme Electric Products Corp., Rochester, N. Y.
Locke Regulator Co., Salem, Mass.
Vapor Car Heating Co., Inc., Chicago, Ill.
Wheelco Instruments Co., Chicago, Ill.
• White-Rodgers Electric Co., St. Louis, Mo.

VALVES, 2, 3, AND 4 WAY

Albright Equipment Co., Johnstown, Pa.
• Alco Valve Co., St. Louis, Mo.
• American Brass Co., Waterbury, Conn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
• Barber-Colman Co., Rockford, Ill.
Belfield Co., H., Philadelphia, Pa.
Bordo Co., Inc., Glenside, Pa.
Bristol Co., Waterbury, Conn.
• Cash Co. A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Davis Engineering Corp., Elizabeth, N. J.
Davis Regulator Co., Chicago, Ill.
• Detroit Lubricator Co., Detroit, Mich.
Farris Engineering Co., Palisades Park, N. J.
• Fisher Governor Co., Marshalltown, Ia.
• General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hunt & Son, C. B., Salem, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
• Johnson Service Co., Milwaukee, Wis.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
• McAlear Mfg. Co., Chicago, Ill.
• Mercoid Corp., Chicago, Ill.
Merco-Nordstrom Valve Co., Pittsburgh, Pa.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Mueller Brass Co., Port Huron, Mich.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Parker Appliance Co., Cleveland, O.
• Penn Electric Switch Co., Goshen, Ind.
Powell Co., Wm., Cincinnati, O.
• Powers Regulator Co., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Sarcotherm Controls, Inc., New York, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
• Taylor Instrument Companies, Rochester, N. Y.
• Walworth Co., New York, N. Y. (Lubricated plug valves)
• Watson-Stillman Co., Roselle, N. J. (Hydraulic service)
Weatherhead Co., Cleveland, O.
Williams Valve Co., D. T., Cincinnati, O.

VANES, DUCT TURNING, PREFABRICATED

• Air Devices, Inc., New York, N. Y.
• Barber-Colman Co., Rockford, Ill.

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Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
• Tuttle & Bailey, Inc., New Britain, Conn.
• Waterloo Register Div. of Associated Manufacturers, Inc., Waterloo, Ia.

VAPOR HEATING SYSTEMS

See Systems, Heating, Vapor

VARIABLE SPEED DRIVES

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical; Reducers, Speed; Pulleys and Sheaves, for Belt Drives

VARIABLE SPEED PULLEYS

See Changers, Speed, Mechanical

V-BELT DRIVES

See Drives, V-Belt

VELOCITY REGULATORS

See Regulators, Air Velocity

VENTILATING HOSE

See Ducts and Duct Fittings, Prefabricated, Non-Metallic

VENTILATION HEATERS

See Surface, Finned, Heating

VENTILATORS, BLACKOUT

Air Conditioning Products Co., Detroit, Mich.
• Carrier Corp., Syracuse, N. Y.
• Chelsea Products, Inc., Irvington, N. J.
• De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
• Young Radiator Co., Racine, Wis.

VENTILATORS, MUSHROOM

Aeolus Dickinson, Chicago, Ill.
Best Register Co., Milwaukee, Wis.
• De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dickinson, Aeolus, Chicago, Ill.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Knowles Mushroom Ventilator Co., Montclair, N. J.
Lumm Co., A. H., Toledo, O.
• Mueller Furnace Co., L. J., Milwaukee, Wis.
Penn Ventilating Co., Philadelphia, Pa.
Peters-Dalton, Inc., Detroit, Mich.
• Tuttle & Bailey, Inc., New Britain, Conn.
Van Noorden Co., E., Boston, Mass.
Ventilating Products Co., Chicago, Ill.

VENTILATORS, ROOF, FAN

Aeolus Dickinson, Chicago, Ill.
Aerovent Fan Co., Piqua, O.
Air Conditioning Products Co., Detroit, Mich.
Air Controls, Inc., Cleveland, O.
Airmaster Corp., Chicago, Ill.
Allen Corp., Detroit, Mich.
American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
American-Larson Ventilating Co., Pittsburgh, Pa.
American Steel Band Co., Pittsburgh, Pa.
Arex Co., Chicago, Ill.
Belanger Fan & Blower Co., Detroit, Mich.
• Bishop & Babcock Co., Cleveland, O.
Breidert Co., G. C., Los Angeles, Calif.
Burt Mfg. Co., Akron, O.
Century Fan & Ventilator Co., New York, N. Y.
• Chelsea Products, Inc., Irvington, N. J.
Clay Equipment Corp., Cedar Falls, Ia.
Davidson Hy Duty Roof Fan Co., Newton, Mass.
• De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dickinson, Aeolus, Chicago, Ill.
Diehl Mfg. Co., Somerville, N. J.
Dual Air Fan Co., Chicago, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Fingles Co., The, Baltimore, Md.
Gallaher Co., The, Owatonna, Minn.
Gehri Co., Tacoma, Wash.
Grand Rapids Blow Pipe & Dust Arrester Corp., Grand Rapids Mich.
Hartzell Propeller Fan Co., Piqua, O.
Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Howes-Woods Co., Cambridge, Mass.
Hunter Fan & Ventilating Co., Inc., Memphis, Tenn.
• Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
Iona Ventilator Co., Inc., Philadelphia, Pa.
• Johnson Fan & Blower Corp., Chicago, Ill.
Jordan & Co., Paul R., Indianapolis, Ind.
Kernchen Co., Chicago, Ill.
King Ventilating Co., Owatonna, Minn.
Klauer Mfg. Co., Dubuque, Ia.
Klee Co., Geo. B., Cincinnati, O.
Lee & Son Co., Thomas, Cincinnati, O.
Lumm Co., A. H., Toledo, O.
Martin Fan & Blower Co., Chicago, Ill.
Mellish & Murray Co., Chicago, Ill.
Mountain States Equipment Co., Denver, Colo.
Myers Electric Co., Inc., Pittsburgh, Pa.
National Metal Fabricators, Chicago, Ill.
Nelson Corp., Herman, Moline, Ill.
New York Blower Co., Chicago, Ill.
Peerless Electric Co., Warren, O.
Penn Ventilating Co., Philadelphia, Pa.
Peters-Dalton, Inc., Detroit, Mich.
Phoenix Ventilator Co., Inc., Brooklyn, N. Y.
• Power Engineering Co., Chicago, Ill.
Powermatic Ventilator Co., Cleveland, O.
Propellair, Inc., Springfield, O.
Reed Unit-Fans, Inc., New Orleans, La.
Robertson Co., H. H., Pittsburgh, Pa.
Royal Ventilator Co., Philadelphia, Pa.
Schwitzer-Cummins Co., Indianapolis, Ind.
Shreveport Engineering Co., Inc., Shreveport, La.
Somers, Inc., H. J., Detroit, Mich.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
Swartwout Co., Cleveland, O.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
• Trane Co., The, La Crosse, Wis.
Trufio Fan Co., Harmony, Pa.
Uno Ventilator Co., Cliftondale, Mass.
Utility Appliance Corp., Los Angeles, Calif.
Van Noorden Co., E., Boston, Mass.
Viking Air Conditioning Corp., Cleveland, O.
Washburne & Co., E. G., New York, N. Y.
Waverly Heating Supply Co., Boston, Mass.
Western Engineering & Mfg. Co., Los Angeles, Calif.
Wind-Way Fan & Ventilator Co., New Orleans, La.
• Wing Mfg. Co., L. J., New York, N. Y.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
• Young Radiator Co., Racine, Wis.

VENTILATORS, ROOF, GRAVITY

A-J Mfg. Co., Kansas City, Mo.
Accurate Mfg. Works, Chicago, Ill.
Aeolus Dickinson, Chicago, Ill.
Air Control Products, Inc., Coopersville, Mich.
• Air Devices, Inc., New York, N. Y.
Allen Corp., Detroit, Mich.
American-Larson Ventilating Co., Pittsburgh, Pa.
American Metal Products Co., Fort Worth, Tex.
American Sheet Metal Works, New Orleans, La.
American Steel Band Co., Pittsburgh, Pa.
Ames Co., W. R., San Francisco, Calif.
Arex Co., Chicago, Ill.
Autoforce Ventilating System, Boston, Mass.
Berger Bros. Co., Philadelphia, Pa.
Breidert Co., G. C., Los Angeles, Calif.
Burt Mfg. Co., Akron, O.
Century Fan & Ventilating Co., New York, N. Y.
Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Clay Equipment Corp., Cedar Falls, Ia.
Danzer Metal Works Co., Hagerstown, Md.
Day Co., The, Minneapolis, Minn.
Dickinson, Aeolus, Chicago, Ill.
Edwards Mfg. Co., Inc., Cincinnati, O.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Fingles Co., The, Baltimore, Md.
Gehri Co., Tacoma, Wash.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Howes-Woods Co., Cambridge, Mass.
International Steel Co., Evansville, Ind.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Iwan Brothers, South Bend, Ind.
Jamar Co., Walker, Duluth, Minn.
Jordan & Co., Paul R., Indianapolis, Ind.
Kernchen Co., Chicago, Ill.
King Ventilating Co., Owatonna, Minn.
Klauer Mfg. Co., Dubuque, Ia.
Kleenaire Corp., Stevens Point, Wis.
La Crosse Sheet Roofing & Corrugating Co., La Crosse, Wis.
Lee & Son Co., Thomas, Cincinnati, O.
Leslie Welding Co., Chicago, Ill.
Levow, David, New York, N. Y.
Lumm Co., A. H., Toledo, O.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Mellish & Murray Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Milcor Steel Co., Milwaukee, Wis.
Moeschl-Edwards Corrugating Co., Inc., The, Cincinnati, O.
Osborn Co., The, J. M. & L. A., Div. of Milcor Steel Co., Cleveland, O.
Patten Co., J. V., Sycamore, Ill.
Penn Ventilating Co., Philadelphia, Pa.
Peters-Dalton, Inc., Detroit, Mich.
Phoenix Ventilator Co., Inc., Brooklyn, N. Y.
Pioneer Roofing & Sheet Metal Co., Muskogee, Okla.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Riggin Metal Products, Inc., Kankakee, Ill.
Robertson Co., H. H., Pittsburgh, Pa.
Royal Ventilator Co., Philadelphia, Pa.
Ryniker Steel Products Co., Billings, Mont.
St. Paul Corrugating Co., St. Paul, Minn.
Sheet Metal Mfg. Co., Inc., Brooklyn, N. Y.
Sioux Steel Co., Sioux Falls, S. D.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Souther Iron Co., E. E., St. Louis, Mo.
Southern States Iron Roofing Co., Savannah, Ga.
Standard Furnace & Supply Co., Omaha, Neb.

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Standard Ventilator Co., Lewisburg, Pa.
Steinhorst & Sons, Inc., Emil, Utica, N. Y.
Swartwout Co., Cleveland, O.
Tierney Rotor Ventilator Co., Minneapolis, Minn.
Tiffin Eaves Trough Co., Tiffin, O.
Uno Ventilator Co., Cliftondale, Mass.
Van Noorden Co., E., Boston, Mass.
Walker Jamar Co., Duluth, Minn.
Western Engineering & Mfg. Co., Los Angeles, Calif.
Willis Steel Corp., Galesburg, Ill.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
York Corrugating Co., York, Pa.

VENTILATORS, UNIT

• Johnson Fan & Blower Corp., Chicago, Ill.
Nelson Corp., Herman, Moline, Ill.
• Nesbitt, Inc., John J., Philadelphia, Pa.
New York Blower Co., Chicago, Ill.
Peerless Unit Ventilation Co., Inc., Bridgeport, Conn.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
• Trane Co., The, La Crosse, Wis.

VIBRATION ABSORBERS

See Absorbers, Vibration

VIBRATION ELIMINATORS

See Absorbers, Vibration; Bases and Pads, Vibration Isolating; Hose, Metal and Fittings

VIBRATION ISOLATORS

See Absorbers, Vibration; Bases and Pads, Vibration Isolating; Hose, Metal and Fittings

VISCOSIMETERS

American Instrument Co., Silver Spring, Md.
Brabender Corp., Rochelle Park, N. J.
Brookfield Engineering Laboratories, Sharon, Mass.
Daigger & Co., A., Chicago, Ill.
Eimer & Amend, New York, N. Y.
Fish-Schurman Corp., New York, N. Y.
General Electric Co., Schenectady, N. Y.
Giannini Co., Inc., G. M., Pasadena, Calif.
Greiner Co., Emil, New York, N. Y.
Humboldt Mfg. Co., Chicago, Ill.
Olsen Testing Machine Co., Tinius, Philadelphia, Pa.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Precision Scientific Co., Chicago, Ill.
Ruehfel Co., Inc., George, Brooklyn, N. Y.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Thermal Syndicate, Ltd., The, New York, N. Y.
Thomas Co., Arthur H., Philadelphia, Pa.
Westinghouse Electric Corp., East Pittsburgh, Pa.
Will Corp., Rochester, N. Y.

VISCOUS LIQUID PUMPS

See Pumps, Viscous Liquids

VISES, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Beaver Pipe Tools, Inc., Warren, O. (Sawing—for tubing)
Billings & Spencer Co., Hartford, Conn.
Crown Die & Tool Co., Chicago, Ill.
Desmond-Stephen Mfg. Co., Urbana, O.
Erie Tool Wks., Erie, Pa.
Hollands Mfg. Co., Erie, Pa.
International Nutyp Tool Co., Oswego, N. Y.
Jarecki Mfg. Co., Erie, Pa.
Munton Mfg. Co., Franklin Park, Ill.
Nye Tool & Machine Co., Chicago, Ill.
• Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Toledo Pipe Threading Machine Co., Toledo, O.
Trimont Mfg. Co., Roxbury, Mass.
Vanderman Mfg. Co., Willimantic, Conn.
Williams & Co., J. H., Buffalo, N. Y.
Yost Mfg. Co., Meadville, Pa.

VISE STANDS

See Stands, Pipe Vise

WALL THERMOSTATS

See Thermostats, Room or Wall

WARM AIR FURNACES

See Furnaces, Warm Air

WASHERS, AIR

• Air & Refrigeration Corp., New York, N. Y.
Airwasher Corp., Lansing, Mich.
Alton Mfg. Co., Dallas, Tex.
American Blower Corp., Detroit, Mich.
Ames Co., W. R., San Francisco, Calif.
Ballantyne Co., Omaha, Neb.
Bayley Blower Co., Milwaukee, Wis.
• Bishop & Babcock Mfg. Co., Cleveland, O.
Blower Application Co., Milwaukee, Wis.
• Buffalo Forge Co., Buffalo, N. Y.
Centri-Spray Co., Detroit, Mich.
• Clarage Fan Co., Kalamazoo, Mich.
Columbus Heating & Ventilating Co., Columbus, O.
Comfort Products Corp., Dallas, Tex.
Drying Systems, Inc., Chicago, Ill.
• Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.
International Sales Co., San Francisco, Calif.
Mellish & Murray Co., Chicago, Ill.
Mountain States Equipment Co., Denver, Colo.
• Murray Mfg. Co., D. J., Wausau, Wis.
New York Blower Co., Chicago, Ill.
Northern Blower Co., Cleveland, O.
Parks-Cramer Co., Fitchburg, Mass.
Peters-Dalton, Inc., Detroit, Mich.
Phillips Cooling Tower Co., Inc., New York, N. Y.
Ross Sprinkler Co., Pasadena, Calif.
Schmieg Industries, Detroit, Mich.
Spray Engineering Co., Somerville, Mass.
Strandwitz & Co., Inc., W. J., Camden, N. J.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
• Trane Co., The, La Crosse, Wis.
• United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
Western Blower Co., Seattle, Wash.
York Corp., York, Pa.

WATER CHILLERS

See Chillers, Water, for Air Conditioning and Refrigeration

WATER DISTRIBUTORS FOR CONDENSERS

See Distributors, Water, for Condensers

WATER FILTERS

See Filters, Water

WATER HEATERS

See Heaters, Indirect, Submerged; Heaters, Water

WATER METERS

See Meters, Water

WATER SOFTENERS

See Softeners, Water

WATER TREATMENT

See Treatment, Water, to Inhibit Corrosion

WATER VAPOR REFRIGERATION

See Compressors, Refrigerating, Centrifugal; and Compressors, Refrigerating, Steam Jet

WELD TESTING MACHINES

See Machines, Testing, Weld

WELDERS, ARC

• Air Reduction Sales Co., New York, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
• Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Borm Mfg. Co., Elgin, Ill.
Coddington Mfg. Co., E. D., Milwaukee, Wis.
Commonwealth Electric Welder Mfg. Co., Philadelphia, Pa.
Eisler Engineering Corp., Newark, N. J.
Electric Arc, Inc., Newark, N. J.
Ergolyte Mfg. Co., Philadelphia, Pa.
Fern, Ralph, Scranton, Pa.
General Electric Co., Schenectady, N. Y.
General Equipment Co., Wichita, Kans.
Hammett Electric Mfg. Co., Kansas City, Mo.
Hampton Electric Mfg. Co., New Kensington, Pa.
ton, Pa.
Harnischfeger Corp., Milwaukee, Wis.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Hobart Bros. Co., Troy, O.
Hollup Corp., Div. of National Cylinder Gas Co., Chicago, Ill.
Heal Electric & Mfg. Co., Mansfield, O.
Lee Co., K. O., Aberdeen, S. D.
Lincoln Electric Co., Cleveland, O.
Maple Valley Mfg. Co., Mapleton, Ia.
Marquette Mfg. Co., Minneapolis, Minn.
Mid-States Equipment Co., Chicago, Ill.
Miller Electric Mfg. Co., Inc., Appleton, Wis.
Pier Equipment Mfg. Co., Benton Harbor, Mich.
Sight Feed Generator Co., Richmond, Ind.
Smith Welding Equipment Corp., Minneapolis, Minn.
Star Electric Motor Co., Bloomfield, N. J.
Trindl Products, Ltd., Chicago, Ill.
Una Welding, Inc., Cleveland, O. (Automatic shielded arc welding)
Universal Power Corp., Cleveland, O.
Welding Apparatus Co., Chicago, Ill.
Westinghouse Electric Corp., East Pittsburgh, Pa.
Will-Weld Mfg. Co., Inc., Omaha, Neb.
Wilson Welder & Metals Co., Inc., New York, N. Y.

WELDERS, SPOT

Acme Electric Welder Co., Los Angeles, Calif.
Agnew Electric Co., Milford, Mich.
Alphil Spot Welding Co., New York, N. Y.

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Coddington Mfg. Co., E. D., Milwaukee, Wis.
Eisler Engineering Corp., Newark, N. J.
Electric Arc, Inc., Newark, N. J.
Federal Machine & Welder Co., Warren, O.
Micro Products Co., Chicago, Ill.
Pier Equipment Mfg. Co., Benton Harbor, Mich.
Rex Welder & Engineering Co., Kansas City, Mo.
Sciaky Bros., Chicago, Ill.
Taylor-Hall Welding Corp., Warren, O.
Taylor-Winfield Corp., Warren, O.
Thomson-Gibb Electric Welding Co., Lynn, Mass.
Universal Power Corp., Cleveland, O.
Weldex, Inc., Detroit, Mich.
Westinghouse Electric Corp., East Pittsburgh, Pa.

WELDERS, STUD

Hollup Corp., Div. of National Cylinder Gas Co., Chicago, Ill.
Nelson Specialty Welding Equipment Corp., San Leandro, Calif.

WELDING COMPOUNDS

See Compounds, Welding

WELDING AND CUTTING APPARATUS, OXY-ACETYLENE

• Air Reduction Sales Co., New York, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Allison Tool & Engineering Co., Los Angeles, Calif.
Atlas Welding Accessories Co., Detroit, Mich. (Weld cleaning tools)
Black Mfg. Co., The, Baltimore, Md.
Dockson Corp., Detroit, Mich.
Ergolyte Mfg. Co., Philadelphia, Pa.
Galv-Weld Products, Dayton, O. (Regalvanizing process)
Harris Calorific Co., The, Cleveland, O.
Hollup Corp., Div. of National Cylinder Gas Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Marquette Mfg. Co., Minneapolis, Minn.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Ransome Machinery Co., Sub. of Worthington Pump & Machinery Corp., Dunellen, N. J. (Welding positioner)
Smith Welding Equipment Corp., Minneapolis, Minn.
Tempil Corp., New York, N. Y. (Temperature indicators)
Torchweld Equipment Div., National Cylinder Gas Co., Chicago, Ill.
Tru-Line Corp., Santa Monica, Calif. (Protractor for marking pipe)
Universal Power Corp., Cleveland, O.
Victor Equipment Co., San Francisco, Calif.
Wall Chemicals Div. of The Liquid Carbonic Corp., Chicago, Ill.

WELDING FUME COLLECTORS

See Exhausters, Welding Fume

WELDING PIPE CLAMPS

See Clamps, Pipe, Welding

WELDING RINGS

See Rings, Welding

WELDING ROD

See Rod, Gas Welding

WHEELS, BLOWER

Advance Aluminum Castings Corp., Chicago, Ill.
Air Controls, Inc., Cleveland, O.
Bayley Blower Co., Milwaukee, Wis.
Beckett & Co., Thomas, Dallas, Tex.
• Bishop & Babcock Mfg. Co., Cleveland, O.
• Burden Fan & Blower Co., Los Angeles, Calif.
Champion Blower & Forge Co., Lancaster, Pa.
• Clarage Fan Co., Kalamazoo, Mich.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Hastings Air Conditioning Co., Hastings, Neb.
Jaden Mfg. Co., Hastings, Neb.
• Janette Mfg. Co., Chicago, Ill.
• Lau Blower Co., Dayton, O.
Martin Fan & Blower Co., Chicago, Ill.
Mayne Products Co., Dayton, O.
Morrison Products, Inc., Cleveland, O.
New York Blower Co., Chicago, Ill.
Peerless Electric Co., Warren, O.
Schwitzer-Cummins Co., Indianapolis, Ind.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.
Torrington Mfg. Co., Torrington, Conn.
• Trane Co., The, LaCrosse, Wis.
Triangle Mfg. Co., Oshkosh, Wis.
• United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Viking Air Conditioning Corp., Cleveland, O.
Western Blower Co., Seattle, Wash.

WHITE PRINT MACHINES

See Machines, Blue Print and White Print

WINDOW VENTILATOR AND FILTER UNITS

See Units, Window Ventilator and Filter

WINDOWS, HEAT INSULATING

Advance Insulating Co., Pittsburgh, Pa.
Andersen Corp., Bayport, Minn.
Chamberlin Co. of America, Detroit, Mich.
Detroit Steel Products Co., Detroit, Mich.
Kane Mfg. Corp., Kane, Pa.
Libbey-Owens Ford Glass Co., Toledo, O.
Mississippi Glass Co., New York, N. Y.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Russell Co., F. C., The, Cleveland, O.
Truscon Steel Co., Youngstown, O.

WOOD PIPE

See Pipe, Wood

WRENCHES, ADJUSTABLE

Billings & Spencer Co., Hartford, Conn.
• Bonney Forge & Tool Works, Allentown, Pa.
Crescent Tool Co., Jamestown, N. Y.
Erie Tool Works, Erie, Pa.
Peck, Stow & Wilcox Co., Southington, Conn.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-On Tools Corp., Kenosha, Wis.
Techtmann Industries, Inc., Milwaukee, Wis.
Trimont Mfg. Co., Boston, Mass.
Williams & Co., J. H., Buffalo, N. Y.

WRENCHES, OPEN END

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Blackhawk Mfg. Co., Milwaukee, Wis.
• Bonney Forge & Tool Works, Allentown, Pa.
J. O. Mfg. Co., South Gate, Calif.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-On Tools Corp., Kenosha, Wis.
Techtmann Industries, Inc., Milwaukee, Wis.
Tubing Appliance Co., Los Angeles, Calif.
Williams & Co., J. H., Buffalo, N. Y.

WRENCHES, PIPE

Armstrong Bros. Tool Co., Chicago, Ill.
Bernz Co., Inc., Otto, Rochester, N. Y.
Billings & Spencer Co., Hartford, Conn.
• Bonney Forge & Tool Works, Allentown, Pa.
Erie Tool Works, Erie, Pa.
International Nutyp Tool Co., Oswego, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
• Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-On Tools Corp., Kenosha, Wis.
Trimont Mfg. Co., Boston, Mass.
USHCO Mfg. Co., Inc., Buffalo, N. Y.
• Walworth Co., New York, N. Y.

WRENCHES, RATCHET

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Blackhawk Mfg. Co., Milwaukee, Wis.
• Bonney Forge & Tool Works, Allentown, Pa.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Greene, Tweed & Co., New York, N. Y.
Lowell Wrench Co., Worcester, Mass.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-On Tools Corp., Kenosha, Wis.
Williams & Co., J. H., Buffalo, N. Y.

WRENCHES, SOCKET

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Blackhawk Mfg. Co., Milwaukee, Wis.
• Bonney Forge & Tool Works, Allentown, Pa.
Chicago Pneumatic Tool Co., New York, N. Y. (pneumatic)
Lowell Wrench Co., Worcester, Mass.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-On Tools Corp., Kenosha, Wis.
Tubing Appliance Co., Los Angeles, Calif.
Williams & Co., J. H., Buffalo, N. Y.

• Advertisement in this issue. See Index to Advertisers, pages 367-368.

WRENCHES, TORQUE INDICATING

Automotive Maintenance Machinery Co., North Chicago, Ill.
Blackhawk Mfg. Co., Milwaukee, Wis.
• Bonney Forge & Tool Works, Allentown, Pa.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-On Tools Corp., Kenosha, Wis.
Sturtevant Co., P. A., Addison, Ill.
Williams & Co., J. H., Buffalo, N. Y.

WROUGHT IRON PIPE

See Pipe, Wrought Iron

WROUGHT IRON SHEETS

See Sheets, Wrought Iron

X-RAY MACHINES AND FILM

See Machines and Film, X-Ray

ZINC SHEETS

See Sheets, Zinc

ZONE CONTROLS

See Systems, Heating, Zone Control

DIRECTORY SECTION

HEATING, PIPING AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 2—TRADE NAMES

A-B—Motor controllers. Allen-Bradley Co., Milwaukee, Wis.

A-C—Water treatment. Elgin Softener Corp., Elgin, Ill.

ABC—Humidifiers. American Blower Corp., Detroit, Mich.

AGP—Heaters. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

A-P—Damper operators, regulators, thermostats, valves. Automatic Products Co., Milwaukee, Wis.

A.P.S. Plasteel—Metal sheets. Protected Steel Products Co., Washington, Pa.

A.R.A.—Non-metallic sheets and board. Wilson, Inc., Grant, Chicago, Ill.

ARRC — Couplings, fittings, flanges, unions. Union Metal Wks., Chelsea, Mass.

ASBO — Ventilators. American Steel Band Co., Pittsburgh, Pa.

A & T Colloid—Boiler cleaning compounds. Agnew & Tomlinson, New York, N. Y.

Abrasoweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Acco-Laxtic—Caulking compounds. Accurate Metal Weather Strip Co., Inc., New York, N. Y.

Ace—Dampers. Martens & Stormoen, Boston, Mass.

Ace—Pipe, pipe and fittings, tanks, valves, pumps. American Hard Rubber Co., New York, N. Y.

Ace—Steam traps. Connor Engineering Corp., W. B., New York, N. Y.

Ace—Welders. Pier Equipment Mfg. Co., Benton Harbor, Mich.

Acidseal—Protective coatings. Goodrich Co., B. F., Akron, O.

Acotite—Enamels and lacquers. Acorn Refining Co., Cleveland, O.

Acousteel — Insulation. Celotex Corp., The, Chicago, Ill.

Acousti-Celotex — Insulation. Celotex Corp., The, Chicago, Ill.

Acoustilite — Insulation. Insulite Co., Minneapolis, Minn.

Acoustone — Insulation. United States Gypsum Co., Chicago, Ill.

Acratherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Adamant—Fire brick cement. Botfield Refractories Co., Philadelphia, Pa.

Ada-Stic—Insulating cement. Botfield Refractories Co., Philadelphia, Pa.

Adjustiblade — Registers. Tuttle & Bailey, Inc., New Britain, Conn.

Adjusto—Packing. Keasbey & Mattison Co., Amoler, Pa.

Adjust-O-Feeder — Feeders, pumps, steam system and water treatment. % Proportioneers, Inc. %, Providence, R. I.

Adjustor — Heating systems. Kehm Corp., The, Chicago, Ill.

Adsco—Coils, coolers, exchangers, heaters, joints, meters, pipe, pipe hangers and supports, pipe protectors, separators, sight glasses, strainers, regulators, valves. American District Steam Co., North Tonawanda, N. Y.

Adsco-Bannon—Conduit. American District Steam Co., North Tonawanda, N. Y.

Adsco Rotary—Condensation meters. American District Steam Co., North Tonawanda, N. Y.

Adsco Vertical—Traps. American District Steam Co., North Tonawanda, N. Y.

Aeracool—Blades, fans, louvers and shutters, ventilators. Myers Electric Co., Inc., Pittsburgh, Pa.

Aerate—Ventilators. Aeolus Dickinson, Chicago, Ill.

Aerisweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Aer-Nu—Air fresheners. Lundy Co., E. A., New York, N. Y.

Aero—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.

Aero-Art—Radiation. National Radiator Co., The, Johnstown, Pa.

Aeroerat—Fans, washers. Ames Co., W. R., San Francisco, Calif.

Aerodyne—Fans. Jeffrey Mfg. Co., Columbus, O.

Aerofuse — Air diffusers. Tuttle & Bailey, Inc., New Britain, Conn.

Aeroplane—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.

Aeroplex—Fans. Bayley Blower Co., Milwaukee, Wis.

Aeropull—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.

Aero Seal—Packing. Chicago Belting Co., Chicago, Ill.

Aerospot—Fans. South Bend Air Products Corp., South Bend, Ind.

Aerovalve—Ventilators. Knowles Mushroom Ventilator Co., Montclair, N. J.

Afco—Fans, furnaces, heaters. American Furnace Co., St. Louis, Mo.

Affco — Grilles, hangers, louvers and shutters. American Foundry & Furnace Co., Bloomington, Ill.

Agastat—Time switches. American Gas Accumulator Co., Elizabeth, N. J.

Agile—Welding electrodes. American Agile Corp., Cleveland, O.

Agitair—Air diffusers, grilles, heaters, vanes, ventilators. Air Devices, Inc., New York, N. Y.

Air Beam—Fans. Schelm Bros., Inc., East Peoria, Ill.

Air Control—Fans, heaters, unit air conditioners. Hastings Air Conditioning Co., Hastings, Neb.

Air Lader—Air diffusers, louvers and shutters. Guth Co Edwin F., St. Louis, Mo

Air Stone—Conduit. Dockstader, S. E., Washington, D. C.

Air-Van — Ventilators. The Gallaher Co., Owatonna, Minn.

Air Vane — Grilles, registers. Rock Island Register Co., Rock Island, Ill.

Airacoustic — Insulation. Johns-Manville, New York, N. Y.

Airco—Welding rod, solder, pipe cutting machines. Air Reduction Sales Co., New York, N. Y.

Aircor—Filters. Air Filter Corp., Milwaukee, Wis.

Air-Con—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Airefiner — Water treatment. Oakite Products, Inc., New York, N. Y.

Airex—Air washers, fans, unit air conditioners, ventilators. Mountain States Equipment Co., Denver, Colo.

Air-Fan—Window ventilator units. Reliable Sheet Metal Engineering Co., Chicago, Ill.

Air-Flo—Dampers, louvers and shutters. Belanger Fan & Blower Co., Detroit, Mich.

Air-flo—Dampers, louvers and shutters. Air Conditioning Products Co., Detroit, Mich.

Air-flo—Ventilators. Aeolus Dickinson, Chicago, Ill.

Air Flow—Fans. Goettl Bros. Metal Prod. Co., Phoenix, Ariz.

Airfoil—Fans, fan blades, ventilators. Aerovent Fan Co., Piqua, O.

Airguide—Hygrometers, thermometers. Fee and Stemwedel, Inc., Chicago, Ill.

Airheater — Unit heaters. Airtherm Mfg. Co., St. Louis, Mo.

Airid—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Airistocrat — Fan blades. Torrington Mfg. Co., Torrington, Conn.

Airkem—Air freshening compound. W. H. Wheeler, Inc., New York, N. Y.

Airline—Grilles, registers. Tuttle & Bailey, Inc., New Britain, Conn.

Airlok — Insulation. Plastegon Wall Board Co., Buffalo, N. Y.

Airmat Arrester — Dust collectors. American Air Filter Co., Inc., Louisville, Ky.

Airmixt — Gas and oil burners. Williams, Inc., F. C., Dearborn, Mich.

Airo-Flex — Registers. Auer Register Co., Cleveland, O.

Airocool — Burners. National Airoil Burner Co., Inc., Philadelphia, Pa.

Airoil—Cleaning compounds, oil burners. National Airoil Burner Co., Inc., Philadelphia, Pa.

Air-o-Line — Indicator-controllers, recorder-controllers. Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.

Air-O-Matic—Refrigerating machines, air conditioning units. Ington, Ill.

Airotherm—Zone control thermostat. Tallmadge & Co., Webster, East Orange, N. J.

Airotor — Blower wheels. Torrington Mfg. Co., Torrington, Conn.

Airout — Ventilators. Western Engineering & Mfg. Co., Los Angeles, Calif.

Airovent—Gas burners. National Airoil Burner Co., Inc., Philadelphia, Pa.

Airridge—Ventilators. Aeolus Dickinson, Chicago, Ill.

Airstat — Regulators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Airstream—Air filters. Brauer Supply Co., A. G., St. Louis, Mo.

Airstream—Blower wheels. Morrison Products, Inc., Cleveland, O.

Airswitch—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Airtrol—Fans. Air Control Products, Inc., Coopersville, Mich.

Airturn—Duct turning vanes. Barber-Colman Co., Rockford, Ill.

Air-Vent—Fans. Airtherm Mfg. Co., St. Louis, Mo.

Air-Wave—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.

Air-X-Hausters — Roof ventilators. Breidert Co., G. C., Los Angeles, Calif.

Airxpel—Steam traps. Wright-Austin Co., Detroit, Mich.

Ajax—Ducts, fittings, ventilators. Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.

Ajax—Gaskets. United States Gasket Co., Camden, N. J.

Akon — Water treatment. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Aktiv—Cleaning compounds. Turco Products, Inc., Los Angeles, Calif.

Alco—Ventilators. Lumm Co., A. H., Toledo, O.

Alcoa — Angles, electrodes, sheets, tanks, tubing. Aluminum Co. of America, Pittsburgh, Pa.

Alkacite—Protective coatings. Protective Coatings, Inc., Detroit, Mich.

Alkalex—Water treatment. Research Products Corp., Madison, Wis.

All-Vac—Heating systems. Lord, Hawley & Hammell, Philadelphia, Pa.

Alnor — Anemometers, indicator controllers, thermometers. Illinois Testing Laboratories, Chicago, Ill.

Alorco—Dehydrators. Aluminum Co. of America, Pittsburgh, Pa.

Aloyco—Stainless steel fittings, nipples, pipe, tubing, unions, valves. Alloy Steel Products Co., Linden, N. J.

Alternare—Arc welders. Electric Arc Inc., Newark, N. J.

Alumaweld—Solder and fluxes. Johnson Co., Lloyd S., Chicago, Ill.

Aluminweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Always Reliable — Benders, cutters, leak detectors, torches, wrenches. Bernz Co., Inc., Otto, Rochester, N. Y.

Amco—Galvanizing powder. American Solder & Flux Co., Philadelphia, Pa.

Amco—Humidifiers, humidistats, hygrometers. American Moistening Co., Providence, R. I.

Amco—Packing. Austin-Mason Co., New York, N. Y.

Amerform—Plastic pipe and fittings, refractories. Commonwealth Products Co., Philadelphia, Pa.

American—Couplings. American Flexible Coupling Co., Erie, Pa.

American—Furnaces, heaters. American Foundry & Furnace Co., Bloomington, Ill.

American — Gages, recorders, regulators, thermometers, valves. American-Schaeffer & Budenberg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.

American — Meters. American Meter Co., Inc., New York, N. Y.

American—Speed reducers. American Pulley Co., Philadelphia, Pa.

American — Steel sheets. American Steel & Wire Co., Cleveland, O.

American — Vibration eliminators. American Metal Hose Branch, American Brass Co., Waterbury, Conn.

American — Pumps, water treatment. American Well Works, Aurora, Ill.

American—Pipe benders. American Pipe Bending Machine Co., Inc., Boston, Mass.

American — Water heater, radiators. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

American Redflash—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

American Water Tube—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Ames — Pumps. Domestic Engine & Pump Co., Shippensburg, Pa.

Aminco — Dehydrant, dehydrators, valves. American Injector Co., Detroit, Mich.

Amirglass—Filters. Amirton Co., New York, N. Y.

Ammco—Wrenches. Automotive Maintenance Machinery Co., North Chicago, Ill.

Ammonoduct — Pipe. Bethlehem Steel Co., Bethlehem, Pa.

Ampac — Arc welders. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Anaconda—Fittings, pipe, welding rod, sheets, solder, tubing, valves. American Brass Co., Waterbury, Conn.

Anemo-light — Air diffusers. Anemostat Corp. of America, New York, N. Y.

Anemo-trol—Air diffusers. Anemostat Corp. of America, New York, N. Y.

Ankorite—Packing. Anchor Packing Co., Philadelphia, Pa.

Anti-Sweat — Insulation. Johns-Manville, New York, N. Y.

A-Pe-Co—Blueprint machines. American Photocopy Equipment Co., Chicago, Ill.

Apex—Analizers, recorders. Uehling Instrument Co., Paterson, N. J.

Apex — Regulators, dampers. Ohio Products Co., Cleveland, O.

Apexior — Coatings. Dampney Co. of America, Boston, Mass.

Aqua-Clear — Water treatment. Sudbury Laboratory, South Sudbury, Mass.

Aqualator—Circulators. Triplex Mfg. Co., Peru, Ind.

Aqua-Master—Water heaters. Century Engineering Corp., Cedar Rapids, Ia.

Aquaseal — Cement and compounds. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Aqua-Tite—Seals. Schwitzer-Cummins Co., Indianapolis, Ind.

Aquatrol — Boiler cleaning compounds and water treatment. Aquatic Chemical Laboratories, Inc., New York, N. Y.

Aqulux—Heaters. Johnson Co., S. T. Oakland, Calif.

Arc-Eng—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Arco — Hangers, plates, radiation, regulators, valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Arctic Circle—Air conditioning units. Goettl Bros. Metal Prod. Co., Phoenix, Ariz.

Arex-Austor—Roof ventilators. Arex Co., Chicago, Ill.

Aridifier—Separators. Logan Engineering Co., Chicago, Ill.

Arlu—Louvers and shutters. Arex Co., Chicago, Ill.

Armco—Pipe, sheets. American Rolling Mill Co., The, Middletown, O.

Armorak — Insulation. Keasbey Co., Robert A., New York, N. Y.

Arrowtrol—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Artic — Refrigerants. du Pont de Nemours & Co., E. I., Electrochemicals Dept., Wilmington, Del.

Asbestocel — Insulation. Johns-Manville, New York, N. Y.

Asco—Valves, relays, switches. Automatic Switch Co., New York, N. Y.

At-a-Glance—Gages. Krueger Sentry Gauge Co., Green Bay, Wis.

Athol — Pipe fittings, unions. Leavitt Machine Co., Orange, Mass.

Atlas — Unions. Rockwood Sprinkler Co., Worcester, Mass.

Attievane—Fans. Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.

Autocrat—Fan blades. Torrington Mfg. Co., Torrington, Conn.

Auto-Klean—Filters, strainers. Cuno Engineering Corp., Meriden, Conn.

Automatic — Tube cleaners. Albright Equipment Co., Johnstown, Pa.

Auto-Tite — Pipe couplings. Superior Railway Products Corp., Pittsburgh, Pa.

Autovent — Eliminators, humidifiers, valves. Maid-O'-Mist, Inc., Chicago, Ill.

Autozone — Zone control unit. Tallmadge & Co., Webster, East Orange, N. J.

Axiflo—Propeller fans. Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.

Axiom—Filters. Blocksom & Co., Michigan City, Ind.

B. B.—Blast gates, valves. Berger Bros. Co., Philadelphia, Pa.

B. B.—Electric motors. Brown-Brockmeyer Co., Dayton, O.

B & B—Heating and air conditioning equipment. Bishop & Babcock Mfg. Co., Cleveland, O.

BCA—Bearings. Bearings Co. of America, Lancaster, Pa.

B & C—Plates. Beaton & Corbin Mfg. Co., Southington, Conn.

B. & G.—Air eliminators, circulators, coolers, fittings, hangers, heat exchangers, heaters, regulators, tanks, thermostats, valves. Bell & Gossett Co., Morton Grove, Ill.

B & K—Pipe cutting and threading machines. Bignall & Keeler Machine Works, Edwardsville, Ill.

B & W—Boilers, burners, desuperheaters, fuel economizers, heat exchangers, refractories, stokers, valves. Babcock & Wilcox Co., New York, N. Y.

B & W—Pipe and tubing. Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.

B & W—Tubing. Babcock & Wilcox Tube Co., The, Welded Tube Div., Alliance, O.

Bacite—Insulation. Bird-Archer Co., Philadelphia, Pa.

Baco—Cleaning compounds, refractories. Bird-Archer Co., Philadelphia Pa.

Badger—Filters. Air Devices, Inc., New York, N. Y.

Badger—Time switches. Reliance Automatic Lighting Co., Racine, Wis.

Baflex—Enamels and lacquers, protective coatings. Roxalin Flexible Finishes, Inc., Elizabeth, N. J.

Balancer—Heating systems. Automatic Temperature Control Co., Inc., Philadelphia, Pa.

Baldwin-Rex—Couplings, chain drives. Chain Belt Co., Milwaukee, Wis.

Balsam-Wool—Insulation. Wood Conversion Co., St. Paul, Minn.

Bankheat—Oil burners. Johnson Co., S. T., Oakland, Calif.

Bar-Brook—Fans, ventilators. Shreveport Engineering Co., Inc., Shreveport, La.

Barcol — Humidistats, motors, operators, regulators, thermostats, valves. Barber-Colman Co., Rockford, Ill.

Barnes — Cutters. Erie Tool Works, Erie, Pa.

Barry—Bearings, pulleys and sheaves. Dick Co., Inc., R. & J., Passaic, N. J.

Barton-American—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.

Base Ray—Baseboard radiation. Burnham Boiler Corp., Irvington, N. Y.

Basifrit—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.

Basimix — Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.

Basmor—Boilers. Bastian-Morley Co., Inc., La Porte, Ind.

Battery—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Bencor—Valves. Beaton & Corbin Mfg. Co., Southington, Conn.

Beauticast—Radiation. Columbia Radiator Co., McKeesport, Pa.

Beaverkill—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.

Bell—Cement. Keasbey & Mattison Co., Ambler, Pa.

Benco — Oil burners. Bennett Co., Omaha, Neb.

Benda Vane — Grilles. Rock Island Register Co., Rock Island, Ill.

Bend-Exy—Grilles, registers. Standard Stamping & Perforating Co., Chicago, Ill.

Bendmaster—Tubing benders. Leonard Precision Products Co., Garden Grove, Calif.

Benton—Boilers. Combination Boiler Co., Benton Harbor, Mich.

Berloy—Steel sheets. Berger Mfg. Div., Republic Steel Corp., Canton, O.

Bestfelt—Insulation. Keasbey & Mattison Co., Ambler, Pa.

Beth-Co-Weld—Pipe. Bethlehem Steel Co., Bethlehem, Pa.

Beth-Cu-Loy—Sheets. Bethlehem Steel Co., Bethlehem, Pa.

B-H — Insulation. Baldwin-Hill Co., Trenton, N. J.

B-H No. 1—Insulating cement. Baldwin-Hill Co., Trenton, N. J.

B-H No. 100—Pipe insulation. Baldwin-Hill Co., Trenton, N. J.

Bi-Air—Burners. John Zink Co., Tulsa, Okla.

Bifurcator — Fans. DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.

Big Midget—Soot blowers. Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.

Bildrite — Insulation. Insulite Co., Minneapolis, Minn.

Bi-Mix—Burners. John Zinc Co., Tulsa, Okla.

Binoc—Thermometers. Taylor Instrument Companies, Rochester, N. Y.

Birm — Water treatment. Research Products Corp., Madison, Wis.

Bison—Boilers. Farrar & Trefts, Buffalo, N. Y.

Bitumastic—Protective coatings. Walles Dove-Hermiston Corp., Westfield, N. J.

Black Magic—Welding compounds. Universal Power Corp., Cleveland, O.

Black Magic—Cement and compounds. Bowser, Inc., Fort Wayne, Ind.

Bloapco—Dust collectors. Blower Application Co., Milwaukee, Wis.

Bloflex — Hose. American Ventilating Hose Co., New York, N. Y.

Blowertrol — Speed changers. White Mfg. Co., St. Paul, Minn.

Blueknight — Enamels and lacquers. Roxalin Flexible Finishes, Inc., Elizabeth, N. J.

Blue-Point — Drills, tools, wrenches. Snap-On Tools Corp., Kenosha, Wis.

Blue Ribbon — Hangers or brackets, nipples, plates. Chicago Nipple Mfg. Co., Chicago, Ill.

Blue Streak—Blueprint machines. Paragon-Revolute Corp., Rochester, N. Y.

Boardman — Pump governors. Locke Regulator Co., Salem, Mass.

Boylout — Cleaning compounds. Apex Engineering Co., Chicago, Ill.

Branford—Oil burners, unions. Malleable Iron Fittings Co., Branford, Conn.

Brazare—Electrodes. Universal Power Corp., Cleveland, O.

Brazo—Solder. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.

Breeze Spreader—Propeller fans. Victor Electric Products, Inc., Cincinnati, O.

Breezo—Fans. Buffalo Forge Co., Buffalo, N. Y.

Bro-For—Boiler compounds. Brown-Ford Corp., Newton, Mass.

Bronzend — Electrodes. Arcos Corp., Philadelphia, Pa.

Broomell—Eliminators, floats, heating systems, traps, valves. Vapor Specialty Co., New York, N. Y.

Brownweld — Finned tubing. Brown Fintube Co., The, Elyria, O.

BTUnit—Unit heaters. Industrial Mfg. & Engineering Co., Chicago, Ill.

Budget — Water heaters. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Bulldog—Shears and snips. Wiss & Sons Co., J., Newark, N. J.

Bull Dog—Stocks and dies. Oster Mfg. Co., Cleveland, O.

Bull Dog — Pipe and tubing. Phelps Dodge Copper Products, British American Tube Div., New York, N. Y.

Bundyflex—Steel tubing. Everhot Products Co., Chicago, Ill.

Bunker Hill — Fittings, pipe, sheets, solder. Northwest Lead Co., Seattle, Wash.

Burks—Pumps. Decatur Pump Co., Decatur, Ill.

Burnham — Compressors, condensers, pumps. Union Steam Pump Co., Battle Creek, Mich.

C-E—Boilers, burners, stokers. Combustion Engineering Co., New York, N. Y.

C-H—Controllers and starters, heaters, relays, switches, valves. Cutler-Hammer, Inc., Milwaukee, Wis.

CJB—Bearings. Ahlberg Bearing Co., Chicago, Ill.

C & M—Hangers or brackets. Carty & Moore Engineering Co., Detroit, Mich.

CMH — Bellows. Chicago Metal Hose Corp., Maywood, Ill.

C.M.W.—Stokers. Catskill Metal Works, Inc., Catskill, N. Y.

COM—Blowers. Wing Mfg. Co., L. J., New York, N. Y.

CW—Pipe. Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.

Cadillac — Meters. Central Station Steam Co., Detroit, Mich.

Cadman—Valves. Barrett Machine Co., N. S. Pittsburgh, Pa.

Cadwell—Pressure regulators, valves. Beaton & Cadwell Mfg. Co., New Britain, Conn.

Calco—Valves. California Brass Mfg. Co., Los Angeles, Calif.

Calktite—Cement and compounds. U. S. Stoneware Co., New York, N. Y.

Cam-Stat — Thermostats, Henry Co., Paul, The, Controls Div., Los Angeles, Calif.

Cantilever — Hygrometers. Standard Thermometer, Inc., Boston, Mass.

Capillary—Air washers, dehumidifiers, humidifiers, unit air conditioners. Air & Refrigeration Corp., New York, N. Y.

Capitol—Boilers, hangers or brackets, heaters, radiation. United States Radiator Corp., Detroit, Mich.

Capitol—Insulation. Standard Lime & Stone Co., Baltimore, Md.

Capitolaire—Furnaces. United States Radiator Corp., Detroit, Mich.

Carend—Electrodes. Arcos Corp., Philadelphia, Pa.

Careyduct — Ducts and duct fittings. Carey Mfg. Co., Philip, Cincinnati, O.

Carstenite—Insulation. Technical Plywoods, Chicago, Ill.

Cash-Acme — Heating systems, pipe strainers, regulators, valves. Cash Valve Mfg. Co., A. W., Decatur, Ill.

Castalu—Fans, wheels. Advance Aluminum Castings Corp., Chicago, Ill.

Castirnare — Electrodes. Universal Power Corp., Cleveland, O.

Cast-Refract — Refractories. Quigley Co., Inc., New York, N. Y.

Cataract — Centrifugal pumps. Red Jacket Mfg. Co., Davenport, Ia.

Cansul — Valves. Lunkenheimer Co., Cincinnati, O.

Cell-U-Blanket — Insulation. Masonite Corp., Chicago, Ill.

Cellufoam—Insulation. Masonite Corp., Chicago, Ill.

Celoron—Couplings. Continental Diamond Fibre Co., Newark, Del.

Celo-Siding—Insulation. Celotex Corp., The, Chicago, Ill.

Cementseal — Enamels and lacquers. Acorn Refining Co., Cleveland, O.

Cemesto—Insulation. Celotex Corp., The, Chicago, Ill.

Central—Conduit, Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.

Centri-Jet—Centrifugal pumps. Red Jacket Mfg. Co., Davenport, Ia.

Centrimax—Meters. Leeds & Northrup Co., Philadelphia, Pa.

Centripac — Packing, Johns-Manville, New York, N. Y.

Centripeller—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.

Centrispray — Air conditioning units. Bahnson Co., Winston-Salem, N. C.

Chaco—Cement and compounds, boiler and radiator sealing compounds. Desolvo Co., The, Pittsburgh, Pa.

Challenger — Stokers. Link-Belt Co., Chicago, Ill.

Champion — Furnaces, heaters. National Heater Co., Minneapolis, Minn.

Charm—Radiation. Thatcher Furnace Co., Garwood, N. J.

Chem-o-Feeder—Feeders, pumps, steam system and water treatment. % Proportioneers, Inc., % Providence, R. I.

Chevron — Packing. Garlock Packing Co., Palmyra, N. Y.

Chicago—Brakes. Dreis & Krump Mfg. Co., Chicago, Ill.

Chicago-Wrigley—Bolts. Chicago Expansion Bolt Co., Chicago, Ill.

Chico Brikset—Cement. Chicago Fire Brick Co., Chicago, Ill.

Chief — Packing. Keasbey & Mattison Co., Ambler, Pa.

Chieftain — Compressors. Tecumseh Products Co., Tecumseh, Mich.

Chill-Vactor — Chillers and steam jet compressors. Croll-Reynolds Engineering Co., Inc., New York, N. Y.

Chinook — Ferrous heating surface. Bayley Blower Co., Milwaukee, Wis.

Chinookfin — Non-ferrous heating surface. Bayley Blower Co., Milwaukee, Wis.

Chip Chaser—Stocks and dies. Oster Mfg. Co., Cleveland, O.

Chlorend — Electrodes. Arcos Corp., Philadelphia, Pa.

Chromalox — Preheaters, unit heaters. Wiegand Co., Edwin L., Pittsburgh, Pa.

Chromend — Electrodes. Arcos Corp., Philadelphia, Pa.

Chromang — Electrodes. Arcos Corp., Philadelphia, Pa.

Chromeweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.

Chromix—Refractories. Quigley Co., Inc., New York, N. Y.

Chronoflo — Flow meters, recorders. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.

Chronometer—Valves. Defender Instrument & Regulator Co., St. Louis, Mo.

Chronotherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Cinch—Expansion bolts. National Lead Co., New York, N. Y.

Circle T—Switches. Trumbull Electric Co., Plainville, Conn.

Circo—Louvers and shutters. Circulators & Devices Mfg. Co., New York, N. Y.

CirCOOLator—Fans, ventilators. Viking Air Conditioning Corp., Cleveland, O.

Clamp-A-Leak — Pipe repair clamps. Chelsea Metal Stamping Co., New York, N. Y.

Clarco—Unit heaters. Clarage Fan Co., Kalamazoo, Mich.

Classic—Registers. Auer Register Co., Cleveland, O.

Cleanduct—Air filters. Research Products Corp., Madison, Wis.

Cle-Bar—Heaters. Cleghorn Co., Boston, Mass.

Climate Changer—Unit air conditioners, unit air coolers. Trane Co., The, La Crosse, Wis.

Climatrol — Boilers. Mueller Furnace Co., L. J., Milwaukee, Wis.

Closin — Bolts. Star Expansion Bolt Co., New York, N. Y.

Cocheco—Belting. Williams & Son, I. B., Dover, N. H.

Cochrane-Becker — Pumps. Cochrane Corp., Philadelphia, Pa.

Code-Craft—Headers, heaters, preheaters, tanks. Zallea Brothers & Johnson, Wilmington, Del.

Coey—Cooling towers. Research Corp., New York, N. Y.

Colalloy—Couplings, fittings, flanges, nipples, pipe, sheets, structural shapes, tubing, unions, valves. Colonial Alloys Co., Metals Div., Philadelphia, Pa.

Cold Stream—Unit air conditioners. Baker Ice Machine Co., Inc., Omaha, Nebr.

Columbia—Odor adsorbers. Carbide and Carbon Chemicals Corp., New York, N. Y.

Columbia—Ventilators. E. E. Souther Iron Co., St. Louis, Mo.

Combustioneer—Stokers. Steel Products Engineering Co., Springfield, O.

Comet—Fans, unit heaters. New York Blower Co., Chicago, Ill.

Comfort-Air — Air washers. Comfort Products Corp., Dallas, Tex.

Comfort Panel—Radiation. Columbus Radiator Co., McKeesport, Pa.

Comfostat—Thermostats. Johnson Service Co., Milwaukee, Wis.

Co-Min-Co—Insulating cement. United States Mineral Wool Co., Chicago, Ill.

Compact — Boilers. Titusville Iron Works Co., Titusville, Pa.

Compact—Radiation. Kohler Co., Kohler, Wis.

Compass—Belting. Goodyear Tire & Rubber Co., Akron, O.

Conco — Boiler cleaning compounds, water treatment. Continental Products Co., Euclid, O.

Condor—Belting, V bolts, pipe. Manhattan Rubber Mfg. Div. of Raybestos Manhattan, Inc., Passaic, N. J.

Condo-Vac — Vacuum pumps. Chicago Pump Co., Chicago, Ill.

Coni-Vane—Ventilators. Allen Corp., Detroit, Mich.

Con-Tac-Tor — Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Con-Tac-Tor — Switches. Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.

Controlled Action — Bellows. Giannini Co., Inc., G. M., Pasadena, Calif.

Control-O-Gas — Valves. Payne Furnace & Supply Co., Inc., Beverly Hills, Calif.

Convector—Humidifiers. Maid-O-Mist, Inc., Chicago, Ill.

Conveyor — Pulleys and sheaves. The American Pulley Co., Philadelphia, Pa.

Coolair—Fans. American Coolair Corp., Jacksonville, Fla.

Coolite — Windows. Mississippi Glass Co., New York, N. Y.

Coolmaster — Unit coolers. Kramer Trenton Co., Trenton, N. J.

Copalite — Cement and compounds, gaskets. National Engineering Products, Inc., Washington, D. C.

Copes—Governors, steam desuperheaters, valves. Northern Equipment Co., Erie, Pa.

Cop-R-Loy — Sheets. Wheeling Steel Corp., Wheeling, W. Va.

Coravol—Corrosion treatment. Western Chemical Co., Kansas City, Mo.

Corkoustic — Insulation. Armstrong Cork Co., Lancaster, Pa.

Cornelius—Air compressors and regulators. North Penn Co., New York, N. Y.

Cottrell — Dust collectors. Research Corp., New York, N. Y.

Cottrell — Dust collectors. Western Precipitation Corp., Los Angeles, Calif.

Crescent—Boiler gage cocks. Wright-Austin Co., Detroit, Mich.

Crescent — Burner. Caloroil Burner Corp., Hartford, Conn.

Crescent—Unions. Star Mfg. Co., Inc., Providence, R. I.

Crescent—Valves. Powell Co., Wm., Cincinnati, O.

Cromaloy—Solder. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.

Crown—Cement and compounds. Colebrook & Sons, Inc., W. H., Syracuse, N. Y.

Crucibleweld — Electrodes. Westinghouse Electric Corp., East Pittsburgh, Pa.

Cushiontone — Insulation. Armstrong Cork Co., Lancaster, Pa.

Cut Master — Vertical turret lathes. Bullard Co., The, Bridgeport, Conn.

Cutno—Packing. Greene, Tweed & Co., New York, N. Y.

Cuttend — Electrodes. Arcos Corp., Philadelphia, Pa.

Cycloidal—Air washers. Blower Application Co., Milwaukee, Wis.

Cyclone—Exhaust heads. Wright Austin Co., Detroit, Mich.

Cyclops—Roller bearings. Roller Bearing Co. of America, Trenton, N. J.

Cyclotherm — Boilers. Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.

DH—Ball bearings. Dodge Mfg. Corp., Mishawaka, Ind.

D & H—Evaporative condensers, cooling and heating surfaces, unit air conditioners. Drayer & Hanson, Inc., Los Angeles, Calif.

DV—Speed changers, v-belt drives. Dodge Mfg. Corp., Mishawaka, Ind.

Damit—Caulking compounds. Quigley Co., Inc., New York, N. Y.

Dana—Exhausters, fans, louvers, ventilators. Klee Co., Geo. B., Cincinnati, O.

Dart — Unions. Fairbanks Co., New York, N. Y.

Day-Steel — Pulleys. Dayton Rubber Mfg. Co., Dayton, O.

Dean—Cleaners. Pierce Co., Wm. B., The, Buffalo, N. Y.

Deflect-O-Grille—Grilles. U. S. Air Conditioning Corp., Minneapolis, Minn.

De Luxe — Strainers. Blackmer Pump Co., Grand Rapids, Mich.

Demandtrol—Valves. Sullivan Valve & Engineering Co., Butte, Mont.

Demon Air-Set—Refractories. Pijbrico Jointless Firebrick Co., Chicago, Ill.

Dereka — Protective coatings. Debevoise Co., The, Brooklyn, N. Y.

De-Sta-Co.—Fan housings, pipe clamps, valves. Detroit Stamping Co., Detroit, Mich.

Detroit — Traps. Nason Co., Detroit, Mich.

Detroit LoStoker — Stokers. Detroit Stoker Co., Detroit, Mich.

Detroit Unistoker — Stokers. Detroit Stoker Co., Detroit, Mich.

Dew-Aire — Air conditioning units. Standard Computing Scale Co., The, Air Conditioning & Refrigeration Div., Detroit, Mich.

Dexter—Valve reseaters. Leavitt Machine Co., Orange, Mass.

Dexter-Goebel — Systems, regulators. National Brass Co., Grand Rapids, Mich.

Di-Acro — Benders, brakes, shears. O'Neil Irwin Mfg. Co., Minneapolis, Minn.

Diamond Fibre—Gaskets. Continental Diamond Fibre Co., Newark, Del.

Diamond H — Switches, thermostats. Hart Mfg. Co., Hartford, Conn.

Dickbelt—Belting and drives. Dick Co., Inc., R. & J., Passaic, N. J.

Dickinson Ferrocast — Exhaust heads, ventilators. Aeolus Dickinson, Chicago, Ill.

Dickrone—V belts and drives. Dick Co., Inc., R. & J., Passaic, N. J.

Dickvalve—Valves. Dick Co., Inc., R. & J., Passaic, N. J.

Difr-enshal-Vacm — Heating systems. Dunham Co., C. A., Chicago, Ill.

Dike—Furnace cement. Klee Co., Geo. B., Cincinnati, O.

Dilecto—Plastic pipe. Continental Diamond Fibre Co., Newark, Del.

Direct—Pipe fittings and flanges, separators, strainers. Straight Line Foundry & Machine Corp., Direct Separator Div., The, Syracuse, N. Y.

Directherm—Direct fired heaters. Airtherm Mfg. Co., St. Louis, Mo.

Discfin—Cooling surface. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.

Disc-Loc—Registers. Knowles Mushroom Ventilator Co., Montclair, N. J.

Distributor—Radiation. Kehm Corp., The, Chicago, Ill.

Divide — Separators. Straight Line Foundry & Machine Corp., Direct Separator Div., The, Syracuse, N. Y.

Dixigas—Gas welding rod. Atlantic Steel Co., Atlanta, Ga.

Do-All—Combination hammer and drill. Wodack Electric Tool Corp., Chicago, Ill.

Dominion—Gaskets, packing. Darcoid Co., Inc., New York, N. Y.

Dorex—Adsorbers. W. B. Connor Engineering Corp., New York, N. Y.

Double Check — Boiler compounds. Hampton-Cross Co., The, Louisville, Ky.

Double Diamond — Hygrometers, recorders, psychrometers. H-B Instrument Co., Philadelphia, Pa.

Double-Seal — Copper tube fittings. Hays Mfg. Co., Erie, Pa.

Double U—Packing. Wayne Davies & Co., Worcester, Mass.

Downmetal—Sheets, structural shapes, tubing, welding rod. Dow Chemical Co., Midland, Mich.

Downblast—Unit heaters. Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.

Down Flo—Unit heaters. McQuay, Inc., Minneapolis, Minn.

Dowtherm — Process heating systems. Dow Chemical Co., The, Midland, Mich.

Draftender—Dampers and damper regulators. Penn Electric Switch Co., Goshen, Ind.

Draftite—Cement. Keasbey & Mattison Co., Ambler, Pa.

Draft-O-Stat — Barometric controls. Hotstream Heater Co., Cleveland, O.

Draftrite—Gages. Bacharach Industrial Instrument Co., Pittsburgh, Pa.

Drainator—Traps. Coe Mfg. Co., Painesville, O.

Drain-Dri—Sump pumps. Yeomans Bros. Co., Chicago, Ill.

Draintrol—Traps. Schaub Engineering Co., Fred H., Chicago, Ill.

DriAir—Dehumidifiers. Tamms Silica Co., Chicago, Ill.

Drift Retriever—Cooling towers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.

Dry-Ex—Water chillers. Acme Industries, Inc., Jackson, Mich.

Dry-Ice—Refrigerants. Pure Carbonic, Inc., New York, N. Y.

Dry-paC — Insulation. Ric-wiL Co., Cleveland, O.

Dryvin—Expansion bolts. Star Expansion Bolt Co., New York, N. Y.

Dualarc—Arc welders. Electric Arc, Inc., Newark, N. J.

Dual-Clone—Dust collectors. Day Co., The, Minneapolis, Minn.

Dualsteel—Unions. Rockwood Sprinkler Co., Worcester, Mass.

Dubbilseal—Insulation. Masonite Corp., Chicago, Ill.

Duco—Enamels and lacquers. du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept., Wilmington, Del.

Ductatherm — Thermostats. Mercoid Corp., The, Chicago, Ill.

Ductype—Fans. South Bend Air Products Corp., South Bend, Ind.

Dulux—Enamels and lacquers. du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept., Wilmington, Del.

Duo Blo—Furnaces. American Furnace Co., St. Louis, Mo.

Duoflo—Pipe line strainers. Sheffler-Gross Co., Philadelphia, Pa.

Duo-Stat — Heating systems, thermostats. Johnson Service Co., Milwaukee, Wis.

Duotrol—Regulators. Automatic Control Co., St. Paul, Minn.

Duplex—Insulation. Keasbey & Mattison Co., Ambler, Pa.

Duplex—Pipe cutting machines. Bignall & Keeler Machine Works, Edwardsville, Ill.

Duplex—Pipe line strainers. Maid-O'-Mist, Inc., Chicago, Ill.

Duplex—Tubing, Bridgeport Brass Co., Bridgeport, Conn.

Durabilt—Observation ports. Chicago Fire Brick Co., Chicago, Ill.

Durabilt — Registers. Auer Register Co., Cleveland, O.

Duradiant—Gas burners. Selas Corp. of America, Philadelphia, Pa.

Dura-Flex—Registers. Auer Register Co., Cleveland, O.

Dura-Fram—Valves. Detroit Lubricator Co., Detroit, Mich.

Dura-Line—Registers. Auer Register Co., Cleveland, O.

Durant — Pipe. Ehret Magnesia Mfg. Co., Valley Forge, Pa.

DuraSpeed—Sprinkler heads. Grinnell Co., Inc., Providence, R. I.

Durco — Fans, fittings, joints, pipe, pumps, sheets, valves. Duriron Co., Inc., Dayton, O.

Durcopump—Fans, fittings, joints, pipe, pumps, sheets, valves. Duriron Co., Inc., Dayton, O.

Durex — Bearings. General Motors Corp., Moraine Products Div., Dayton, O.

Durichlor—Fans, fittings, joints, pipe, pumps, sheets, valves. Duriron Co., Inc., Dayton, O.

Durimet — Fans, fittings, joints, pipe, pumps, sheets, valves. Duriron Co., Inc., Dayton, O.

Durobrace—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Duro Gloss—Steel sheets. Jessop Steel Co., Washington, Pa.
Duroplastic — Caulking compounds. Acorn Refining Co., Cleveland, O.
Dustkop—Dust collectors. Aget-Detroit Co., Ann Arbor, Mich.
Dust-Stop—Air filters. Owens-Corning Fiberglass Corp., Toledo, O.
Dustube — Dust collectors. American Foundry Equipment Co., Mishawaka, Ind.
Dutch Boy—Solder. National Lead Co., New York, N. Y.
Duxbak—Leather belting and packing. Schieren Co., Chas. A., New York, N. Y.
Dux-Sulation — Insulation. Wilson, Inc., Grant, Chicago, Ill.
Dynaflow — Fans. South Bend Air Products Corp., South Bend, Ind.
Dynetric—Balancing equipment. Gisholt Machine Co., Madison, Wis.
E-C—V belts. Goodyear Tire & Rubber Co., Akron, O.
E C & M—Motor controls, switches. Electric Controller & Mfg. Co., Cleveland, O.
E.Z.—Hangers or brackets, soot destroyers. Healy Ruff Co., St. Paul, Minn.
Eafco—Fittings. Eastern Foundry Co., Boyertown, Pa.
Eastern—Tanks. Case & Son Mfg. Co., W. A., Buffalo, N. Y.
Easternoil—Oil burners. Eastern Oil Equipment Co., Portland, Me.
Easyclean—Strainers. Wright-Austin Co., Detroit, Mich.
Easy-Flo—Solder. Handy & Harman, New York, N. Y.
Easyweld—Electrodes. Universal Power Corp., Cleveland, O.
Eclipse—Alarms, governors, regulators, traps, valves. Illinois Engineering Co., Chicago, Ill.
Eclipse—Hose. Bendix Aviation Corp., Philadelphia Div., Philadelphia, Pa.
Econolux—Boilers. Johnson Co., S. T., Oakland, Calif.
Econ-o-matic—Bases. American Pulley Co., Philadelphia, Pa.
Economizer — Nozzles. Bahnson Co., Winston-Salem, N. C.
Economy — Boilers, heaters. International Heater Co., Utica, N. Y.
Economy—Heating systems. Maid-O'-Mist, Inc., Chicago, Ill.
Economy—Regulators. Dockson Corp., Detroit, Mich.
Economy—Unit ventilators. Arex Co., Chicago, Ill.
Econovent—Ventilators. Western Engineering & Mfg. Co., Los Angeles, Calif.
Edgeseal—Air filters. Wilson & Co., Chicago, Ill.
Efco — Heat exchangers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Effco—Louvers and shutters. Hirschman-Pohle Co., Inc., LeRoy, N. Y.
"88" — Pipe covering. Eagle-Picher Co., Cincinnati, O.
88-A—Pipe vise stands. Nye Tool & Machine Co., Chicago, Ill.
Ejectoplaque—Air diffusers. Air & Refrigeration Corp., New York, N. Y.
Elasto Rib—Vibration isolating bases. Korfund Co., Inc., Long Island City, N. Y.
El-Bow — Ventilators. Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Electric Filter Watchman—Gages. Herbusch Corp., The, St. Louis, Mo.
Electrifugal—Centrifugal pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Electro-Airmat—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Cell—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Matic—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Hot—Heaters. Red Spot Electric Co., Tacoma, Wash.
Electro-Mist — Collector, air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Sheet—Sheets. American Brass Co., Waterbury, Conn.
Electro-Wind—Ventilators. Allen Corp., Detroit, Mich.
Electrozone—Ozone apparatus. Automatic Pump & Softener Corp., Rockford, Ill.
Electrunite — Stainless steel tubing. Steel and Tubes, Div. of Republic Steel Corp., Cleveland, O.
Elesco—Fuel economizers, superheaters. Combustion Engineering Co., Inc., New York, N. Y.
Elgex—Steam system treatment. Elgin Softener Corp., Elgin, Ill.
Elgin—Arc welders. Borm Mfg. Co., Elgin, Ill.
Elgin — Louvers and shutters. Elgo Shutter & Mfg. Co., Detroit, Mich.
Elite—Registers. Auer Register Co., Cleveland, O.
Elm—Dampers. Elgo Shutter & Mfg. Co., Detroit, Mich.
Elsco—Electric motors. Electric Spray-it Co., The, Sheboygan, Wis.
Elturn—Duct turning vanes. Barber-Colman Co., Rockford, Ill.
Embee—Cement and compounds. Montgomery Bros., San Francisco, Calif.
Emco—Meters, regulators. Pittsburgh Equitable Meter Co., Pittsburgh, Pa.
Emergency—Steam traps. Wright-Austin Co., Detroit, Mich.
Enamel-Kote—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Enco—Burners, regulators. Engineer Co., New York, N. Y.
Enduro—Packing. Keasbey & Mattison Co., Ambler, Pa.
Enduro — Pipe, sheets, tubing. Steel and Tubes, Div. of Republic Steel Corp., Cleveland, O.
Enduro—Unions. Jefferson Union Co., Inc., New York, N. Y.
Entrained Combustion — Gas burners. Mettler Co., Lee B., Los Angeles, Calif.
Equantherm—Zone control thermostat. Tallmadge & Co., Webster, East Orange, N. J.
Equiflo — Valves. Grinnell Co., Inc., Providence, R. I.
Erodnet—Insulation. Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Erwin—Dampers. Elgo Shutter & Mfg. Co., Detroit, Mich.
Esso—Oil burners. Gilbert & Barker Mfg. Co., West Springfield, Mass.
Esso Bond—Refractories. Ramtite Co., The, Chicago, Ill.
Eureka—Valves. Ohio Pattern Wks. & Foundry Co., Eureka Valve Div., Cincinnati, O.
Evactor—Pumps. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Evapotrol—Valves. Alco Valve Co., St. Louis, Mo.
Exco—Valves. Electric Valve Mfg. Co., Inc., New York, N. Y.
Exenaction — Valves. Taylor Instrument Companies, Rochester, N. Y.
Everflex — Hose, coils, and tubing. Everhot Products Co., Chicago, Ill.
Eversharp—Cutters. Everhot Products Co., Chicago, Ill.
Evertite — Clamps. Everhot Products Co., Chicago, Ill.
Evrtyte—Valves. Strong, Carlisle & Hammond Co., Cleveland, O.
Excel—Unions. Jefferson Union Co., Inc., New York, N. Y.
Excelsior—Pumps. Foster Pump Works, Inc., Brooklyn, N. Y.
Excelso — Water heaters. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Exhaustair—Fans. New York Blower Co., Chicago, Ill.
Exidust—Dust collectors. Allen Bill-myre Co., Mamaroneck, N. Y.
Extra Dry Esoteo—Liquid sulphur dioxide. Virginia Smelting Co., West Norfolk, Va.
Eye-Hye—Gages. Reliance Gauge Column Co., Cleveland, O.
Ez-arc—Arc welders. Will-Weld Mfg. Co., Inc., Omaha, Neb.
E-Z-ON — Damper quadrants. Gerett Corp., M. A., Milwaukee, Wis.
Ezy-Kleen—Strainers. Blackmer Pump Co., Grand Rapids, Mich.
F & E—Stokers. Flynn & Emrich Co., Baltimore, Md.
Fabrikated — Grilles, registers. Independent Register Co., Cleveland, O. New York, N. Y.
Faircoseal — Valves. Fairbanks Co., New York, N. Y.
Fan-Air — Gas burners. Mettler Co., Lee B., Los Angeles, Calif.
Fan-Pac—Fans. DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Fanmix—Burners. Coppus Engineering Corp., Worcester, Mass.
Far-Air—Air conditioning units, filters, humidifiers. Farr Co., Los Angeles, Calif.
Farnsworth — Pumps. O'Brien Steam Specialty Co., Syracuse, N. Y.
Farragut—Packing. Darcoid Co., Inc., New York, N. Y.
Fast's—Couplings. Koppers Co., Bartlett Hayward Div., Baltimore, Md.
Favorite — Ratchet wrenches. Greene, Tweed & Co., New York, N. Y.
Featherfin—Heating and cooling surface. Wing Mfg. Co., L. J., New York, N. Y.
Featherweight — Propeller fans. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Featherweight — Unit heaters. Wing Mfg. Co., L. J., New York, N. Y.
Fel-Pro—Gaskets, packing. Felt Products Mfg. Co., Chicago, Ill.
Felt Cote — Metal sheets. American Steel Band Co., Pittsburgh, Pa.
Fenestra — Heat insulating windows. Detroit Steel Products Co., Detroit, Mich.
Fenn's Rotary—Ventilators. Waverly Heating Supply Co., Boston, Mass.
Fenox—Compounds, Halowax Products Div., Union Carbide & Carbon Corp., New York, N. Y.
Fero — Radiation. Burnham Boiler Corp., Irvington, N. J.
Ferrenewo—Valves. Lunkenheimer Co., Cincinnati, O.
Ferrocind — Insulation. Truscon Steel Co., Youngstown, O.
Ferro-Therm — Insulation. American Flange & Mfg. Co., Inc., New York, N. Y.
Ferroweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Fiberglas—Insulation. Owens-Corning Fiberglas Corp., Toledo, O.
Fiberlite — Insulation. Insulite Co., Minneapolis, Minn.
Filmflo — Deaerators. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Fine-screen—Strainers. Yarnall-Waring Co., Philadelphia, Pa.
Fin-Flex — Registers. Auer Register Co., Cleveland, O.
Findlay—Stokers. Central Rubber & Steel Corp., Findlay, O.
Fin-Line — Registers. Auer Register Co., Cleveland, O.
Finstrip—Heaters. Wiegand Co., Edwin L., Pittsburgh, Pa.
Firecrete — Refractories. Johns-Manville, New York, N. Y.
Fire-Felt—Insulation. Johns-Manville New York, N. Y.
Fire-Guard — Stokers. Peerless Mfg. Corp., Louisville, Ky.
Fire-Hearth — Refractories. Fireline Stove & Furnace Lining Co., Chicago, Ill.
Fire Tender—Stokers. Holcomb & Hoke Mfg. Co., Indianapolis, Ind.
Firefoil—Insulating panel. Carey Mfg. Co., Philip, Cincinnati, O.
Firelte—Furnace cement, refractories. Johns-Manville, New York, N. Y.
Fireline—Refractories. Fireline Stove & Furnace Lining Co., Chicago, Ill.
Fireset—Refractories. Walsh Refractories Corp., St. Louis, Mo.
Fireye—Alarms, flame failure controls. Combustion Control Corp., Cambridge, Mass.
Flaremaster—Benders. Everhot Products Co., Chicago, Ill.

Flat Belt—Pulleys and sheaves. The American Pulley Co., Philadelphia, Pa.

Flatjet—Spray nozzles. Spraying Systems Co., Chicago, Ill.

Fleetweld—Welding electrodes. Lincoln Electric Co., Cleveland, O.

Fleet-X—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.

Flexare—Arc welders. Westinghouse Electric Corp., East Pittsburgh, Pa.

Flexair — Grilles, registers. Tuttle & Bailey, Inc., New Britain, Conn.

Flexaust—Hose. American Ventilating Hose Co., New York, N. Y.

Flexcord—Drives. Gates Rubber Co., Denver, Colo.

Flexeal — Gaskets. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Flexiblac—Protective coatings. Samuel Cabot, Inc., Boston, Mass.

Flexigrip — Fittings. Gustin Bacon Mfg. Co., Kansas City, Mo.

Flexiwound — Gaskets. Azor Corp., Irvington, N. J.

Flexodise — Expansion joints. Croll-Reynolds Engineering Co., Inc., New York, N. Y.

Floatrol—Switches. Automatic Control Co., St. Paul, Minn.

Flex-Tube—Analyzers, gages, manometers. Dwyer Mfg. Co., F. W., Chicago, Ill.

Flo-Klean — Filters, strainers. Cuno Engineering Corp., Meriden, Conn.

Flo-scope — Meters. Selas Corp. of America, Philadelphia, Pa.

Flotrol—Humidifiers, valves. Cleveland Humidifier Co., Cleveland, O.

Flo-watch — Flow meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.

Flualyzer—Analyzers. Engelhard, Inc., Chas., Newark, N. J.

Fluid Heat — Gasoline fired heaters. Anchor Post Fence Co., Fluid Heat Div., Baltimore, Md.

Flush-Kleen — Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.

Foamglas — Insulation. Armstrong Cork Co., Lancaster, Pa.

Foamglas — Insulation. Pittsburgh Corning Corp., Pittsburgh, Pa.

Foamglas—Insulation. Pittsburgh Plate Glass Co., Pittsburgh, Pa.

Force-Flo—Circulators, heaters, regulators, systems, tanks. Kehm Corp., The, Chicago, Ill.

Fordair—Compressors. Schramm, Inc., West Chester, Pa.

Forest Fleece—Insulation. Doheny Co., John J., Belmont, Mass.

Fracto-Crete — Refractories. Ramtite Co., The, Chicago, Ill.

Francke—Flexible couplings. Waldron Corp., John, New Brunswick, N. J.

Free-Aire — Air conditioning units, heaters. Kehm Corp., The, Chicago, Ill.

Free-Flow—Ventilators. Burt Mfg. Co., Akron, O.

Fre-Flo — Strainers. Fisher Governor Marshalltown, Ia.

Freon — Refrigerant. Kinetic Chemicals, Inc., Wilmington, Del.

Fresh Air Maker—Propeller fans, units, ventilators. Schwitzer-Cummins Co., Indianapolis, Ind.

Frevent—Valves. Bridgeport Brass Co., Bridgeport, Conn.

Frictionized—Belting. Baldwin Belting, Inc., New York, N. Y.

Frigid—High pressure blowers, propeller fan blades and fans. Circulators & Devices Mfg. Corp., New York, N. Y.

Frigistat — Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Frigitower—Cooling towers. Thermal Industries, Indio, Calif.

Frostaire — Air conditioning units. Palmer Mfg. Corp., Phoenix, Ariz.

Fuel Saver — Boilers. International Boiler Works Co., East Stroudsburg, Pa.

Fulflo — Filters. Commercial Filters Corp., Boston, Mass.

Fuljet—Spray nozzles. Spraying Systems Co., Chicago, Ill.

Fulscope — Recorders, recorder-controllers, regulators. Taylor Instrument Companies, Rochester, N. Y.

Fyhr-Tech—Gaskets and sheets. Technical Ply-Woods, Chicago, Ill.

Fyr-Feeder—Spreader stokers. American Coal Burner Co., Chicago, Ill.

Fyrite—Analyzers. Bacharach Industrial Instrument Co., Pittsburgh, Pa.

G. B. C.—Fans. General Blower Co., Inc., Philadelphia, Pa.

G-E — Condensers. General Electric Co., Air Conditioning Dept., Bloomfield, N. J.

G-E Glow—Lamps. General Electric Co., Lamp Dept., Nela Park, Cleveland, O.

G-M — Louvers and shutters. Gillian Mfg. Co., Detroit, Mich.

G-Flo — Cooling and heating surface. Griscom-Russell Co., The, New York.

G-R—Oil coolers, water chillers. Griscom-Russell Co., The, New York, N. Y.

G-R—Unit coolers and air conditioners. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.

Gasgun — Torches. Century Aircraft, Inglewood, Calif.

Gast — Filters, separators. Johnson Corp., Three Rivers, Mich.

Gasweld — Torches, welding rod and apparatus. Liquid Carbonic Corp., The, Chicago, Ill.

Gasweld—Welding and cutting apparatus. Ergolyte Mfg. Co., Philadelphia, Pa.

Geddes—Radiation. Fowler & Wolfe Radiator Co., Norristown, Pa.

Gemco — Compressors. General Machinery Co., Spokane, Wash.

Gemco—Bolts, hangers and supports, insulation. Goodloe E. Moore Co., Danville, Ill.

Gemware — Hygrometers, psychrometers, thermometers. G. M. Mfg. Co., New York, N. Y.

Genuine Stillson—Wrenches. Walworth Co., New York, N. Y.

Germicidal — Lamps. General Electric Co., Lamp Dept., Cleveland, O.

Gerotor—Rotary pumps. May Oil Burner Corp., Baltimore, Md.

Giant — Radiator hangers. Western Hanger Co., San Francisco, Calif.

Gilbarco — Compressors, oil burners. Gilbert & Barker Mfg. Co., West Springfield, Mass.

Gilsonite—Protective coatings. Ohmlac Paint & Refining Co., Chicago, Ill.

Gilt Edge—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.

Gimco — Insulation. National Gypsum Co., Buffalo, N. Y.

Gland-Pakt—Expansion joints. Yarnall-Waring Co., Philadelphia, Pa.

Glazola — Caulking compounds. Nebel Mfg. Co., Cleveland, O.

Globack—Pipe flanges. Midwest Piping & Supply Co., Inc., St. Louis, Mo.

Globe—Ventilators. Osborn Co., The J. M. & L. A., Div., of Milcor Steel Co., Cleveland, O.

Glowan—Gas burners. Martin, J. O. & C. U., San Francisco, Calif.

Gloweld—Welded steel tubing. Globe Tubes Co., Milwaukee, Wis.

Goetzerit—Packing. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Gohi — Sheets. Newport Rolling Mill Co., Newport, Ky.

Gold Bond—Insulation. National Gypsum Co., Buffalo, N. Y.

Goodyearite—Packing. Goodyear Tire & Rubber Co., Akron, O.

Grad-U-Motor — Damper operators. Minneapolis - Honeywell Regulator Co., Minneapolis, Minn.

Gradustat — Regulators, thermostats. Minneapolis - Honeywell Regulator Co., Minneapolis, Minn.

Gradutrol—Diaphragm valves. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Graylite—Insulation. Insulite Co., Minneapolis, Minn.

Greastop—Air filters. Air-Maze Corp., Cleveland, O.

Grid — Cooling and heating surface, radiation, unit heaters. Murray Mfg. Co., D. J., Wausau, Wis.

Grillometer—Direct reading air velocity meters. Detroit Air Conditioning Service Co., Inc., Detroit, Mich.

Gritseald—Rotary pumps. St. Louis Tool Co., St. Louis, Mo.

Gruvagrip — Couplings. Gustin Bacon Mfg. Co., Kansas City, Mo.

Guardian—Gaskets. Garlock Packing Co., Palmyra, N. Y.

Gunmix — Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.

Gun-Pakt—Expansion joints. Yarnall-Waring Co., Philadelphia, Pa.

Guthfan—Fans. Guth Co., Edwin F., St. Louis, Mo.

H & C — Grilles, registers. Hart & Cooley Mfg. Co., Holland, Mich.

H-O-H — Compounds, feeders, steam system and water treatment. Haering & Co., Inc., D. W., Chicago, Ill.

H-T — Smoke alarms. Autempco Corp., New York, N. Y.

Hairbestos—Insulation. Wilson & Co., Chicago, Ill.

Haircraft—Insulation. Wilson & Co., Chicago, Ill.

Hammerkraft — Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.

Hammermill—Belting. Goodyear Tire & Rubber Co., Akron, O.

Hazamer-On—Damper quadrants. Air Control Products, Inc., Coopersville, Mich.

Hammer-Set — Bolts. Rawlplug Co., Inc., The, New York, N. Y.

Handy—Benders. Holsclaw Bros., Inc., Evansville, Ind.

Handy—Ducts and duct fittings. Meyer & Bro. Co., F., Peoria, Ill.

Handy Andy — Vise stands. Western Wire Products Co., St. Louis, Mo.

Hardweld — Electrodes. Lincoln Electric Co., Cleveland, O.

Hartman — Air conditioning units. Norwood Filtration Co., The, Florence, Mass.

Hartmann — Heaters. Montgomery Bros., San Francisco, Calif.

Haveg—Tanks. Continental Diamond Fibre Co., Newark, Del.

Hazleton — Pumps, strainers, valves. Barrett, Haentjens & Co., Hazleton, Pa.

Health-Air—Ventilator and filter units. Reliable Sheet Metal Engineering Co., Chicago, Ill.

Health-Aire—Fans, heaters, unit coolers, ventilators. Johnson Fan & Blower Co., Chicago, Ill.

Hearth Patch—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.

Heart-Oak—Belting. Graton & Knight Co., Worcester, Mass.

Heat-aid—Refractories. Pyrolite Products Co., Cleveland, O.

Heath-Crete—Refractories. Quigley Co., Inc., New York, N. Y.

Heatomat—Heaters. Richmond Radiator Co., Gas Products Div., Uniontown, Pa.

Heat-O-Meter — Temperature regulators, thermostats. Miller Heat-O-Meter Co., Milwaukee, Wis.

Heatrex — Heaters. Whiting Stoker Sales Co., Chicago, Ill.

Heat-Rite—Registers. Auer Register Co., Cleveland, O.

Heat-Tite—Insulating cement. Ramtite Co., The, Chicago, Ill.

Helical—Tubing. Rome-Turney Radiator Co., Rome, N. Y.

Hellite—Refractories. Johns-Manville New York, N. Y.

Hensel—Welders. Maple Valley Mfg Co., Mapleton, Ia.

Herco—Arc welders. Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.

Herculoy—Welding rod, tubing. Revere Copper and Brass, Incorporated, New York, N. Y.

Hevikoat—Electrodes. Universal Power Corp., Cleveland, O.

Highflex—Belting. Goodrich Co., B. F., Akron, O.

High-Ten-500—Solder. Industrial Service Laboratories, Milwaukee, Wis.

Hi-Gloss—Steel sheets. Jessop Steel Co., Washington, Pa.

Hilger—Chillers, refrigerating compressors, unit coolers, unit air conditioners, valves. XL Refrigerating Co., Inc., Chicago, Ill.

Hi-Lift—Pumps. Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.

Hi-Lo—Alarms. Yarnall-Waring Co., Philadelphia, Pa.

Hi-Lo—Pumps. Yeomans Bros. Co., Chicago, Ill.

Hi-Seal—Cement and compounds. Greene, Tweed & Co., New York, N. Y.

Hi-Spra—Spray nozzles. Thermal Industries, Indio, Calif.

Hitchings—Boilers. Burnham Boiler Corp., Irvington, N. Y.

Hi-Temp—Insulation. Carey Mfg. Co., Philip, Lockland, Cincinnati, O.

Holdtite—Solder. American Brass Co., Waterbury, Conn.

Hollo-Tech—Doors and panels. Technical Ply-Woods, Chicago, Ill.

Holt—Strainers, tube cleaners. Rosedale Foundry & Machine Co., Pittsburgh, Pa.

Holtite—Clamps. Yarnall-Waring Co., Philadelphia, Pa.

Horneblende—Caulking compounds. North American Fibre Products Co., The, Cleveland, O.

Horton—Tanks. Chicago Bridge & Iron Co., Chicago, Ill.

Hot Shot—Pumps. Yeomans Bros. Co., Chicago, Ill.

Hot Spot—Spot welders. Acme Electric Welder Co., Los Angeles, Calif.

Hotpoint—Water heaters. Edison General Electric Appliance Co., Inc., Chicago, Ill.

Hovalco—Valves. Homestead Valve Mfg. Co., Coraopolis, Pa.

Huber—Stokers. Flynn & Emrich Co., Baltimore, Md.

Humiclean—Cleaning compounds, water treatment. Carolina Aniline & Extract Co., Charlotte, N. C.

Humidair—Humidifiers. Skilbeck Mfg Co., Kenosha, Wis.

Humidigrad — Humidifiers. Cleveland Humidifier Co., Cleveland, O.

Humidigraph — Humidity recorders. Bristol Co., Waterbury, Conn.

Humidiguide—Hygrometers. Taylor Instrument Companies, Rochester, N. Y.

Humidostat—Humidistats. Johnson Service Co., Milwaukee, Wis.

Humiduct—Humidifiers, unit air conditioners. Bahnson Co., Winston-Salem, N. C.

Humi-Temps—Unit air coolers. Larkin Coils, Atlanta, Ga.

Humphrey—Unit heaters. General Gas Light Co., Kalamazoo, Mich.

Hurivent—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Hycarb—Electrodes. Universal Power Corp., Cleveland, O.

Hydra — Valves. Albright Equipment Co., Johnstown, Pa.

Hydralt — Protective coatings. Flintkote Co., The, New York, N. Y.

Hydramotor—Valves. General Controls Co., Glendale, Calif.

Hydro—Recorders. Bacharach Industrial Instrument Co., Pittsburgh, Pa.

Hydro—Packing. Keasbey & Mattison Co., Ambler, Pa.

Hydro-Clone—Dust collectors, welding fume exhausters. Whiting Corp., Harvey, Ill.

Hydro-Foil — Pumps. Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.

Hydron—Bellows, traps. Clifford Mfg. Co., Boston, Mass.

Hydrovac—Pumps. Ames Hydrovac Inc., Brooklyn, N. Y.

Hydro-Whirl — Dust collectors, spray booths. Peters-Dalton, Inc., Detroit, Mich.

Hydryer — Dehumidifiers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.

Hy-Duty—Blower wheels, fans. Schwitzer-Cummins Co., Indianapolis, Ind.

Hy-Power—Shears and snips. Wiss & Sons Co., J., Newark, N. J.

Hy-Speed—Pipe vises. Munton Mfg. Co., Franklin Park, Ill.

Hy-Temp—Cement, insulation. Keasbey & Mattison Co., Ambler, Pa.

Hytemplte—Cement, refractories. Quigley Co., Inc., New York, N. Y.

Hy-Test—Water heaters. Smith Co., Inc., H. B., The, Westfield, Mass.

I-R—Ingersoll-Rand, New York, N. Y.

Ice Engine—Gas and diesel engines. Waukesha Motor Co., Waukesha, Wis.

Ice-O-Matic — Refrigerating compressors. Williams Oil-O-Matic Heating Corp., Bloomington, Ill.

Icy-Flo—Accumulators. McQuay, Inc., Minneapolis, Minn.

Ideal—Blowers. Perfection Grate & Stoker Co., Springfield, Mass.

Ideal—Water heaters, valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Ideal—Ventilators. Tuttle & Bailey, Inc., New Britain, Conn

Ideal—Traps. Nason Co., Detroit, Mich.

Immersatherm — Thermostats. Mercoid Corp., The, Chicago, Ill.

Impact—Spray nozzles. Cooling Tower Co., Inc., The, Div. of the Fluor Corp., Ltd., New York, N. Y.

Imperial—Boilers. National Radiator Co., The, Johnstown, Pa.

Impulse — Traps. Yarnall-Waring Co., Philadelphia, Pa.

Inco—Pipe fittings, pipe, rod, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.

Inconel—Pipe fittings, pipe, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.

IngAclad—Stainless clad sheets. Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.

In-Hib-Co—Protective coatings. Haering Co., Inc., D. W., Chicago, Ill.

Inkstop — Air filters. Air-Maze Corp., Cleveland, O.

Ins-lite—Insulation. Insulite Co., Minneapolis, Minn.

Instant—Heaters, preheaters. Johnson Corp., Three Rivers, Mich.

Insnlag—Insulation. Quigley Co., Inc., New York, N. Y.

Insulbrix—Refractories. Quigley Co., Inc., New York, N. Y.

Insulerete—Insulating cement, refractories. Quigley Co., Inc., New York, N. Y.

Insulduct — Ducts and duct fittings. Smith-Raymond Co., Columbus, Ga.

Insulfil—Insulation. Refractory & Insulation Corp., New York, N. Y.

Insulmat—Insulation. Mortell Co., J. W., Kankakee, Ill.

Insulwool—Insulation. General Insulating Products Co., Brooklyn, N. Y.

Insutube—Insulation. Union Asbestos & Rubber Co., Cicero, Ill.

Integral Jet—Burners. Stout & Sons, David, St. Louis, Mo.

Intensare—Electrodes. National Carbon Co., New York, N. Y.

Inter-Matic—Time switches. International Register Co., Chicago, Ill.

Involute—Spray nozzles. Yarnall-Waring Co., Philadelphia, Pa.

Ionaire—Ionization apparatus. Electro-aire Corp., Chicago, Ill.

Irenew—Powell Co., Wm., Cincinnati, Ohio.

Iron Lung — Ventilators. Powermatic Ventilator Co., Cleveland, O.

Ironset — Furnace cement. Fireline Stove & Furnace Lining Co., Chicago, Ill.

Isomodes—Bases and pads. M. B. Mfg. Co., The, New Haven, Conn.

J & C—Burners, fans, furnaces, heaters. Jackson & Church Co., Saginaw, Mich.

J. B.—Pumps. Pacific Pump Works, Huntington Park, Calif.

J F S—Speed changers. Stephens-Adamson Mfg. Co., Aurora, Ill.

J-M Ball—Floats, traps. Cryer Trap & Valve Co., Inc., New York, N. Y.

Jacobus — Valves. Majot Automatic Machine Co., Inc., East Orange, N. J.

Janitrol—Boilers, burners, heaters, unit air conditioners. Surface Combustion Corp., Toledo, O.

Jarco—Unions, valves. Jarecki Mfg Co., Erie, Pa.

Jay Gee Silica Gel—Dehydrators. Joliet Chemicals, Inc., Joliet, Ill.

Jennings—Pumps, ejectors. Nash Engineering Co., South Norwalk, Conn.

Jetal—Protective coatings. Alrose Chemical Co., Providence, R. I.

Jewel—Packing. Keasbey & Mattison Co., Ambler, Pa.

Jiffy Clips—Hangers and supports. Minerallac Electric Co., Chicago, Ill.

John Crane—Cement and compounds. Crane Packing Co., Chicago, Ill.

Jointite — Insulation. Mundet Cork Corp., Brooklyn, N. Y.

Jones — Stokers. Riley Stoker Corp., Worcester, Mass.

Junior—Radiation. Weil-McLain Co., Chicago, Ill.

Jusrite—Ducts and duct fittings. Corbman Bros., Inc., Philadelphia, Pa.

K—Fittings. Kuhns Brothers Co., Dayton, O.

K. A. T.—Compounds and water treatment. American K.A.T. Corp., New York, N. Y.

K-B—Dampers, regulators. Kerentoff G. L., Cincinnati, O.

K-Fin—Cooling and heating surface. Griscom-Russell Co., The, New York, N. Y.

K and M—Alarms, controls, strainers, traps, valves. Kieley & Mueller, Inc., North Bergen, N. J.

K-S-V—Ventilators. Kernchen Co., Chicago, Ill.

Kable Kord—Belting. Gilmer Co., L. H., Div. of United States Rubber Co., Philadelphia, Pa.

Kane — Boilers. Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.

Karbate—Carbon pipe, heat exchangers, pumps. National Carbon Co., New York, N. Y.

Kathabar — Dehumidifiers, humidifiers, unit air conditioners. Surface Combustion Corp., Toledo, O.

Kaukit—Caulking compounds. Sonneborn Sons, Inc., L., New York, N. Y.

Kearsarge—Gaskets, packing. Johns-Manville, New York, N. Y.

Kentucky—Sheets. Newport Rolling Mill Co., Newport, Ky.

Key-Tite—Cement and compounds. Key Co., East St. Louis, Ill.

Kidskin—Packing. Darcoid Co., Inc., New York, N. Y.

Kimsul — Insulation. Kimberly-Clark Corp., Neenah, Wis.

King-clip—Valves. Lunkenheimer Co., Cincinnati, O.

King-Gage—Gages. King Engineering Corp., Ann Arbor, Mich.

Kleen Air—Air filters. Kaye & MacDonald, Inc., West Orange, N. J.

Kleen Tube—Heaters. Vapor Car Heating Co., Inc., Chicago, Ill.

Kleenflo — Unit air filters. Air-Maze Corp., Cleveland, O.

Klingtite—Belting. Goodyear Tire & Rubber Co., Akron, O.

Klixon—Temperature controls. Spencer Thermostat Co., Attleboro, Mass.

Klondike—Arc welders. Fern, Ralph Scranton, Pa.

K-Master—Strainers, traps. Kaye & MacDonald, Inc., West Orange, N. J.

Knight-Ware — Pipe, prefabricated ducts, valves. Knight, Maurice A., Akron, O.

Knock-Out — Arc welders. Lee Co., K. O., Aberdeen, S. D.

Kno-Draft—Air diffusers. Connor Engineering Corp., W. B., New York, N. Y.

Kool-Shade — Solar heat resisting screens. Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.

Kooler-Aire — Commercial air conditioners. United States Air Conditioning Corp., Minneapolis, Minn.

Koroloc—Protective coatings. Goodrich Co., B. F., Akron, O.

Koroseal—Plastic tubing, protective coatings. Goodrich Co., B. F., Akron, O.

Koven—Boilers. Waterfilm Boilers, Inc., Jersey City, N. J.

Kristokrak — Enamels and lacquers. Zapon Div., Atlas Powder Co., North Chicago, Ill.

Krupp—Valves. Shank Co., Cyrus, Chicago, Ill.

Kwikflux — Solder. Special Chemicals Co., New York, N. Y.

L. A.—Motors. Louis Allis Co., Milwaukee, Wis.

L M—Tubing. Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.

L&N—Regulators. Leeds & Northrup Co., Philadelphia, Pa.

L-R—Couplings. Lovejoy Flexible Couplings Co., Chicago, Ill.

L. R. D. — Valves. Grinnell Co., Inc., Providence, R. I.

Laddi—Heaters. Johnson Co., S. T., Oakland, Calif.

Lamneck—Ducts & duct fittings. Clayton & Lambert Mfg. Co., Middletown, O.

Lawson—Wrenches. USHCO Mfg. Co., Inc., Buffalo, N. Y.

Lead-Sealed—Lead sheets. Continental Steel Corp., Kokomo, Ind.

Leaflex—Enamels and laquers. Roxalin Flexible Finishes, Inc., Elizabeth, N. J.

Lectrodryer—Dehumidifiers. Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.

Ledaloyl — Sleeve bearings. Johnson Bronze Co., New Castle, Pa.

Levelometer—Gages, recorders. Liquidometer Corp., Long Island City, N. Y.

Liberty—Packing. Johns-Manville, New York, N. Y.

Liberty—Ventilators. Penn Ventilating Co., Philadelphia, Pa.

Light Duty — Pulleys. Gates Rubber Co., The, Denver, Colo.

Lightning—Cleaning compounds. Western Chemical Co., Kansas City, Mo.

Lightweight Champion — Pipe cutting machines. Nye Tool & Machine Co., Chicago, Ill.

Lightweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.

Lima—Stokers. Carnes, Inc., John R., Lima, O.

Limit-Load—Centrifugal fans. Buffalo Forge Co., Buffalo, N. Y.

Limitorque—Valves. Philadelphia Gear Works, Inc., Philadelphia, Pa.

Limpet—Insulation. Keasbey & Mattison Co., Ambler, Pa.

Line-o-flo—Grilles. Barber-Colman Co., Rockford, Ill.

Lin-X—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.

Lipco—Cement lined fittings and pipe. Cement Lined Pipe Co., Lynn, Mass.

Lipman—Compressors, cooling surface, water chillers. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.

Liquivator — Steam traps. Morehead Mfg. Co., Detroit, Mich.

Little Blacksmith — Punches, shears. Kidder Mfg. Co., Inc., J. F., Burlington, Vt.

Little Giant—Stocks and dies. Greenfield Tap & Die Corp., Greenfield, Mass.

Little Giant—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.

Lloyd—Solder and fluxes. Johnson Co., Lloyd S., Chicago, Ill.

Lo-Blast—Burners. National Gas Burners, Div. of Mid-Continent Metal Products Co., Chicago, Ill.

Locarb—Electrodes. Universal Power Corp., Cleveland, O.

Lockaire—Insulation. Plastergon Wall Board Co., Buffalo, N. Y.

Lockseam—Pipe. Naylor Pipe Co., Chicago, Ill.

Locktite — Regulators, dampers. Ohio Products Co., Cleveland, O.

Lodi—Boilers. Super Mold Corp., Lodi, Calif.

Lok-Joint — Insulation. Insulite Co., Minneapolis, Minn.

Lolag—Heaters. American Instrument Co., Silver Spring, Md.

Lo-Maintenance—Motors and starters. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Longrip—Pipe extractors. Ridge Tool Co., Elyria, O.

Lookout Heggie-Simplex — Boilers. Lookout Boiler & Mfg. Co., Chattanooga, Tenn.

Lord Burnham — Boilers. Burnham Boiler Corp., Irvington, N. Y.

Lowcost—Boilers. Murray Iron Wks. Co., Burlington, Ia.

Loxin—Bolts. Star Expansion Bolt Co., New York, N. Y.

Lubricore—Packing. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Lul—Unit coolers. Merchant & Evans Co., Philadelphia, Pa.

Luminare—Electrodes. Universal Power Corp., Cleveland, O.

Lyonore—Sheets. Lyon, Conklin & Co., Inc., Baltimore, Md.

M. E.—Motors. Marathon Electric Mfg. Corp., Wausau, Wis.

M. & E.—Refrigerating compressors and condensers. Merchant & Evans Co., Philadelphia, Pa.

M & M — Alarms, cut-offs, feeders, humidifiers, operators, switches, valves. McDonnell & Miller, Inc., Chicago, Ill.

M & S—Gaskets. Mitchell & Smith, Inc., Detroit, Mich.

MIF — Couplings, fittings. Malleable Iron Fittings Co., Branford, Conn.

MKO—Pumps. Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.

M-R-C—Ball bearings. Marlin-Rockwell Corp., Jamestown, N. Y.

MTB — Oil burners. John Zinc Co., Tulsa, Okla.

M/W and A/C Airmnt — Air filters. American Air Filter Co., Inc., Louisville, Ky.

Macheta—Fans, fan blades, ventilators. Aerovent Fan Co., Piqua, O.

Magic-Grip — Sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Magic-Weather — Air washers, fans. Ballantyne Co., Omaha, Nebr.

Magnefer—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.

Majestic — Boilers. Ames Iron Wks., Div. of Pierce Butler Radiator Corp., Oswego, N. Y.

Manganend 13—Electrodes. Arcos Corp., Philadelphia, P.

Manganend 2M—Electrodes. Arcos Corp., Philadelphia, Pa.

Manganweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Mangenare — Electrodes. Universal Power Corp., Cleveland, O.

Magnetrol—Alarms, cut-offs, switches. Schaub Engineering Co., Fred H., Chicago, Ill.

Mani-Ply—Insulation. Keasbey & Mattison Co., Ambler, Pa.

Mark Time—Time switches, time delay relays. Rhodes, Inc., M. H., Hartford, Conn.

Marsalis—Dust collectors, fans, pumps, ventilators, air conditioning units. American Metal Products Co., Fort Worth, Tex.

Martell—Packing. France Packing Co., Tacony, Philadelphia, Pa.

Marval—Valves. Marsh Corp., Jas. P., Chicago, Ill.

Mascobond—Furnace cement. Munn & Steele, Inc., Newark, N. J.

Mascocement—Refractories. Munn and Steele, Inc., Newark, N. J.

Mascoknst—Refractories. Munn and Steele, Inc., Newark, N. J.

Mascolite—Pipe insulation. Munn and Steele, Inc., Newark, N. J.

Mascote—Insulation. Munn and Steele, Inc., Newark, N. J.

Massachusetts — Fans, unit heaters, blower wheels, air washers. Bishop & Babcock Mfg. Co., Cleveland, O.

Master — Stokers. Muncie Gear Wks., Inc., Muncie, Ind.

Master — Thermostats, regulators, switches. White Mfg. Co., St. Paul, Minn.

Master—Unions. Jefferson Union Co., Inc., New York, N. Y.

Master Kraft—Oil burners, unit heaters. Harvey-Whipple, Inc., Springfield, Mass.

Master Pilot—Valves. Powell Co., Wm., Cincinnati, O.

McDaniel — Floats, traps. Watson & McDaniel Co., Philadelphia, Pa.

McKee — Blowers, boilers, burners, feeders, pumps, regulators, tanks, torches, valves. Eclipse Fuel Engineering Co., Rockford, Ill.

McKeesport — Radiation. Columbia Radiator Co., McKeesport, Pa.

McKnight—Registers. Tuttle & Bailey, Inc., New Britain, Conn.

Measurrench — Wrenches. Williams & Co., J. H., Buffalo, N. Y.

Mechanovent—Ventilators. New York Blower Co., Chicago, Ill.

Meco — Torches, valves, welding rod. Modern Engineering Co., St. Louis, Mo.

Mellohlu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.

Mel-Rock—Humidifiers, units, ventilators, washers. Mellish & Murray Co., Chicago, Ill.

Merkustat — Regulators, switches. Marsh Corp., Jas. P., Chicago, Ill.

Merrill Process — Heating systems. Parks-Cramer Co., Fitchburg, Mass.

Metal-Master — Shears. Wiss & Sons Co., J., Newark, N. J.

Metermax — Combustion control systems. Leeds & Northrup Co., Philadelphia, Pa.

Metl-Tech—Doors and panels, metal sheets. Technical Ply-Woods, Chicago, Ill.

Metric—Meters. American Meter Co. Inc., New York, N. Y.

Metrotherm — Thermostats. General Controls Co., Glendale, Calif.

Micafil—Insulation. Munn and Steele, Inc., Newark, N. J.

Mico—Insulation. Mineral Insulation Co., Chicago Ridge, Ill.

Micro—Low water cut-offs. Maid-O-Mist, Inc., Chicago, Ill.

Micro-Feed — Humidifiers. Cleveland Humidifier Co., Cleveland, O.

Micromax — Hygrometers, recorders, recorder-controllers, thermometers. Leeds & Northrup Co., Philadelphia, Pa.

Micromet—Water treatment. Calgon Inc., Pittsburgh, Pa.

Microstat—Thermostats. Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.

Microtherm—Thermostats. Barber-Colman Co., Rockford, Ill.

Microval—Pumps. Stokes Machine Co., F. J., Philadelphia, Pa.

Microwax — Smoke alarms. Leeds & Northrup Co., Philadelphia, Pa.

Micro-Weld—Spot welders. Micro Products Co., Chicago, Ill.

Midget — Radiation. Utica Radiator Corp., Utica, N. Y.

Mills—Boilers. Smith Co., Inc., H. B., The, Westfield, Mass.

Milvaco—Air eliminators, floats, strainers, traps, valves. Milwaukee Valve Co., Milwaukee, Wis.

Milwaukee—Heaters. Blower Application Co., Milwaukee, Wis.

Minit Stoker—Water heaters. Catskill Metal Works, Inc., Catskill, N. Y.

Miracle Air—Window ventilator units. Reliable Sheet Metal Engineering Co., Chicago, Ill.

Mir-O-Meter—Combustion control systems. Bowser, Inc., Fort Wayne, Ind.

Mirro-Matic—Heaters. Handley Brown Heater Co., Jackson, Mich.

Mirro-Shell—Heaters. Handley Brown Heater Co., Jackson, Mich.

Mixend — Electrodes. Arcos Corp., Philadelphia, Pa.

MKayO — Boilers. Mears-Kane-Ofeldt Inc., Philadelphia, Pa.

Mobilene — Gaskets. Johns-Manville New York, N. Y.

Model Star—Valves. Powell Co., Wm. Cincinnati, O.

Moderator — Heating system. Warren Webster Co., Camden, N. J.

ModernAire—Fans, unit air conditioners. Dallas Engineering Co., Inc., Dallas, Tex.

Moduflow — Control systems. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Modustat — Valves. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Modutrol — Heating systems. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Modutron — Regulators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Mogul—Packing. Johns-Manville, New York, N. Y.

Mogul—Boiler cleaning compounds and water treatment. North American Fibre Products Co., The, Cleveland, O.

Mohawk—Pipe. Cohoes Rolling Mill Co., Cohoes, N. Y.

Moisturator—Humidifiers. Bridgeport Brass Co., Bridgeport, Conn.

Monerief — Sheet metal pipe and fittings. Henry Furnace Co., The, Medina, O.

Monel—Pipe fittings, pipe, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.

Mongol — Pipe joint cement and compounds. Baer Bros., New York, N. Y.

Monmouth—Filters, humidifiers, valves. Cleveland Humidifier Co., Cleveland, O.

Mono-Block—Insulation. Baldwin-Hill Co., Trenton, N. J.

Mono-Cast—Pipe. American Cast Iron Pipe Co., Birmingham, Ala.

Monoflo — Hot water heating systems and fittings. Bell & Gossett Co., Morton Grove, Ill.

Mono-Line—Refractories. Quigley Co., Inc., New York, N. Y.

Monovent—Ventilators. Burt Mfg. Co., Akron, O.

Monsoon—Heating and cooling surface. Ice Air Conditioning Co., New York, N. Y.

Monsoon—Fans, grilles, louvers. Jamieson Mfg. Co., Dallas, Texas.

Morflex — Flexible couplings. Morse Chain Co., Ithaca, N. Y.

Mortairset—Refractories. Walsh Refractories Corp., St. Louis, Mo.

Mortex—Protective coatings. Mortell Co., J. W., Kankakee, Ill.

Mortite—Caulking compounds, gaskets. Mortell Co., J. W., Kankakee, Ill.

Motoco—Gages, gage glasses, recorders, thermometers. Electric Auto-Lite Co., Instrument & Gauge Div., La Crosse, Wis.

Moto-Merco—Relays. Automatic Temperature Control Co., Inc., Philadelphia, Pa.

Motopump—Pumps. Yeomans Bros. Co., Chicago, Ill.

Motor—Pulleys and sheaves. The American Pulley Co., Philadelphia, Pa.

MotoReducer — Speed reducers. Philadelphia Gear Works, Inc., Philadelphia, Pa.

Motorstoker — Stokers. Hershey Machine & Foundry Co., Motorstoker Div., Manheim, Pa.

Motosteel—Valves. Taylor Instrument Companies, Rochester, N. Y.

Mototurb—Ventilators. Uno Ventilator Co., Cliftondale, Mass.

Muffletone—Insulation. Celotex Corp., The, Chicago, Ill.

Mullitex—Refractories. Walsh Refractories Corp., St. Louis, Mo.

Mult-Au-Matic—Threading and boring machines. Bullard Co., The, Bridgeport, Conn.

Multiblade—Welding fume exhausters. General Blower Co., Chicago, Ill.

Multiclone—Dust collectors. Western Precipitation Corp., Los Angeles, Calif.

Multi-Duty—Air filters. American Air Filter Co., Inc., Louisville, Ky.

Multiduty—Pulleys and sheaves. Gates Rubber Co., The, Denver, Colo.

Multifin—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Multiport—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Multiseal—Gaskets. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Multi-Seal—Bolts, repair plugs. Rolyan Metal Products, Chicago, Ill.

Multitherm — Air conditioning units. Clarage Fan Co., Kalamazoo, Mich.

Multi-V—V-belts. Goodrich Co., B. F., Akron, O.

Multi-V-Drive—Flagbelt drives. Worthington Pump & Machinery Corp., Harrison, N. J.

Multivane—Fans, blowers, unit heaters. B. F. Sturtevant Co., Div. of Westinghouse Electric Corp., Boston, Mass.

Multi-Vent—Ceiling panels. Pyle-National Co., The, Chicago, Ill.

Multi-Wash—Dust collectors. Schneible Co., Claude B., Detroit, Mich.

Murco — Aftercoolers, cooling towers, heat exchangers, unit heaters. Murray Mfg. Co., D. J., Wausau, Wis.

Murex—Welding electrodes. Metal & Thermit Corp., New York, N. Y.

Murray—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

N-M-D — Valves. Lunkenheimer Co., Cincinnati, O.

N-R—Heat exchangers. National Radiator Co., The, Johnstown, Pa.

NYBCo Steelfin—Heating surface. New York Blower Co., Chicago, Ill.

Naico — Boiler cleaning compounds, water treatment. National Aluminate Corp., Chicago, Ill.

National—Fans, furnaces, heaters. Magirl Foundry & Furnace Works, P. H., Bloomington, Ill.

National — Pumps. Austin-Mason Co., New York, N. Y.

Natur Temp — Insulation. Plastergon Wall Board Co., Buffalo, N. Y.

Naturzone—Insulation. Wilson & Co., Chicago, Ill.

Nelson—Pumps. Haering Co., Inc., D. W., Chicago, Ill.

Nelson—Stokers. Heating Assurance, Inc., Spokane, Wash.

Nemo — Insulating cement. Smith & Kanzler Corp., Elizabeth, N. J.

New Cyclone—Dust collectors. Kirk & Blum Mfg. Co., Cincinnati, O.

Newarc—Welding electrodes. Electric Arc, Inc., Newark, N. J.

Niagara—Meters. Buffalo Meter Co., Buffalo, N. Y.

Nibco—Fittings, joints, valves. Northern Indiana Brass Co., Elkhart, Ind.

Nickelend — Electrodes. Arcos Corp., Philadelphia, Pa.

No-Drip—Insulation. Mortell Co., J. W., Kankakee, Ill.

Non-clog—Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.

Non-clog—Pipe line strainers. Boylston Steam Specialty Co., Chicago, Ill.

Non-Clogging — Spray nozzles. Link-Belt Co., Chicago, Ill.

Non-Con-Dux — Cement, insulation. Wilson, Inc., Grant, Chicago, Ill.

Non-Flash — Brazing torches, welding and cutting apparatus. Torchweld Equipment Div., National Cylinder Gas Co., Chicago, Ill.

Non-Frost — Insulation. Keasbey & Mattison Co., Ambler, Pa.

Non-Sweat — Insulation. Keasbey & Mattison Co., Ambler, Pa.

No-Ox-Id—Protective coatings. Dearborn Chemical Co., Chicago, Ill.

Norblo—Dust collectors, fans, washers. Northern Blower Co., Cleveland, O.

Nordstrom—Valves. Merco-Nordstrom Valve Co., Pittsburgh, Pa.

No-Rivet — Regulators, dampers. Ohio Products Co., Cleveland, O.

Northwestern—Water heaters. Coe Mfg. Co., Painesville, O.

Northwind—Unit air coolers. Pleasantaire Corp. of America, Washington, D. C.

Norwesco — Cement and compounds, boiler and radiator sealing compounds. Atlas Chemical Co., Marietta, O.

No-Site—Louvers and shutters. Waterloo Register Co., Div. of Associated Manufacturers, Inc., Waterloo, Ia.

No Streak — Registers. Rock Island Register Co., Rock Island, Ill.

No-Vent—Pumps. Stout & Sons, David, St. Louis, Mo.

No-Ve-U—Door ventilators. Waterloo Register Co., Div. of Associated Manufacturers, Inc., Waterloo, Ia.

Novoid—Insulation. Cork Import Corp., New York, N. Y.

Novus—Boilers. National Radiator Co., The, Johnstown, Pa.

Nu-Air—Fans, window ventilator units. Meier Electric & Machine Co., Indianapolis, Ind.

Nu-Air—Ventilators. Milcor Steel Co., Milwaukee, Wis.

Nu-Alpina — Ventilators. Milcor Steel Co., Milwaukee, Wis.

Nudry—Cement, Pyrolite Products Co., Cleveland, O.

Nu-Grip—Shears and snips. Wiss and Sons Co., J., Newark, N. J.

Nu-Notch — Mushroom ventilators. Knowles Mushroom Ventilator Co., Montclair, N. J.

Nuvent—Ventilators. Acolus Dickinson, Chicago, Ill.

Nu-Wood — Insulation. Wood Conversion Co., St. Paul, Minn.

OB—Valves. Ohio Brass Co., Mansfield, O.

O.E.F. — Preheaters, water heaters. Frank Heaters, Inc., Paterson, N. J.

OK—Motors. Marathon Electric Mfg. Corp., Wausau, Wis.

OK—Stocks and dies. Greenfield Tap & Die Corp., Greenfield, Mass.

OPW—Valves. Ohio Pattern Works & Foundry Co., Cincinnati, O.

Oakwood—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.

Octopus — Welding fume collectors. Chelsea Products, Inc., Irvington, N. J.

Ofeldt—Boilers, superheaters. Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.

Oilbuster—Boiler cleaning compounds. Cannon Chemical Co., Everett, Mass.

Oil-O-Matic — Oil burners. Williams Oil-O-Matic Heating Corp., Bloomington, Ill.

Okay Tred—Leather belting. Houghton & Co., E. F., Philadelphia, Pa.

Ol' Faithful — Humidifiers. Maid-O'-Mist, Inc., Chicago, Ill.

One Venturi — Heating systems. Tate Heaters, Inc., New York, N. Y.

Orangeburg — Fiber pipe. Fibre Conduit Co., Orangeburg, N. Y.

Orifice — Valves. Dunham Co., C. A., Chicago, Ill.

Oswego—Cutters, punches, wrenches. International Nutyp Tool Co., Oswego, N. Y.

Ovaltube—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.

Oxweld—Welding rod, welding and cutting apparatus. Linde Air Products Co., The, New York, N. Y.

Ozite—Insulation. American Hair & Felt Co., Chicago, Ill.

PC—Air conditioning units. Buffalo Forge Co., Buffalo, N. Y.

PDQC — Pipe machines. Bignall & Keeler Machine Works, Edwardsville, Ill.

P & H—Welding electrodes. Harnischfeger Corp., Milwaukee, Wis.

P & H Hansen—Arc Welders. Harnischfeger Corp., Milwaukee, Wis.

P. I. V. Gear—Speed changers. Link-Belt Co., Philadelphia, Pa.

PTP—Pipe fittings, steel tubing. Pipe & Tube Products, Inc., Jersey City, N. J.

Paintgrip — Sheets. American Rolling Mill Co., The, Middletown, O.

Palco—Packing. Greene, Tweed & Co., New York, N. Y.

Palco Wool-Saferized—Insulation. Pacific Lumber Co., The, San Francisco, Calif.

Palmaire—Furnaces, unit heaters. Palmer Mfg. Corp., Phoenix, Ariz.

Palmetto—Packing. Greene, Tweed & Co., New York, N. Y.

Palmetto Supersheet — Gaskets and packing. Greene, Tweed & Co., New York, N. Y.

Par — Condensing units. Lynch Mfg. Corp., Defiance, O.

Paracoil—Coils, condensers, heaters, oil coolers, preheaters, steam traps, valves, water chillers. Davis Engineering Corp., Elizabeth, N. J.

Paraline—Motor bases. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Parasol—Spray nozzles. Spraying Systems Co., Chicago, Ill.

Parko—Psychrometers. Parks-Cramer Co., Fitchburg, Mass.

Pathfinder—Belting. Goodyear Tire & Rubber Co., Akron, O.

Pax-Tite—Leather packing. Watson-Stillman Co., Roselle, N. J.

Peer—Welders. Pier Equipment Mfg. Co., Benton Harbor, Mich.

Peerless — Humidifiers, air washers. New York Blower Co., Chicago, Ill.

Peerless — Pipe machines. Bignall & Keeler Machine Works, Edwardsville, Ill.

Peerless Wall — Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Penco—Plastic fittings, pipe and tubing. North Penn Co., New York, N. Y.

Pendex—Absorbers, hose. Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.

Penn-M-Co—Fittings. Penn Mfg. Corp. of Washington, Pa., Washington, Pa.

Perco-Flash—Water heaters. Kresno-Stamm Mfg. Co., New York, N. Y.

Perfection — Electrodes. Carlin Co., Anthony, Cleveland, O.

Perfection—Plates. Beaton & Cadwell Mfg. Co., New Britain, Conn.

Perfection—Valves. American District Steam Co., North Tonawanda, N. Y.

Permo-Aire—Filters. Air Devices, Inc., New York, N. Y.

Petro—Oil burners, water heaters. Petroleum Heat & Power Co., Stamford, Conn.

Pexto — Brakes, punches, shears, wrenches. Peck, Stow & Wilcox Co., Southington, Conn.

Pierce-Firebox — Boilers. Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.

Pilot—Fans, motors. Smith Mfg. Co., Inc., F. A., Rochester, N. Y.

Pilot—Valves. Powell Co., Wm., Cincinnati, O.

Pioneer—Regulators, switches, thermostats. Master Electric Co., Aircraft & Electrical Controls Div., Dayton, O.

Pipe Master — Pipe cutting machines. Oster Mfg. Co., Cleveland, O.

Pipemaster—Wrenches. Erie Tool Wks., Erie, Pa.

Pipetite—Cement and compounds. Lake Chemical Co., Chicago, Ill.

Pitco — Unions. Pittsburgh Valve & Fittings Corp., Barberton, O.

Pittsburgh — Radiator, unit heaters. Automatic Gas Equipment Co., Pittsburgh, Pa.

Pittsburgh-National — Meters. Pittsburgh Equitable Meter Co., Pittsburgh, Pa.

Planeweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.

Plasgon—Cement and compounds. Samuel Cabot, Inc., Boston, Mass.

Plasti-Calk — Caulking compounds. Chamberlin Co. of America, Detroit, Mich.

Plastikon—Caulking compounds. Goodrich Co., B. F., Akron, O.

Plastiseal — Cement and Compounds. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Plastite — Caulking compounds. U. S. Stoneware Co., New York, N. Y.

Plastoid—Caulking compounds, furnace cement. Plastic Products Co., Detroit, Mich.

Playford—Stokers. Rosedale Foundry & Machine Co., Pittsburgh, Pa.

Plexifin—Unit heaters. Bayley Blower Co., Milwaukee, Wis.

Plexiform—Fans. Bayley Blower Co., Milwaukee, Wis.

Pliatube — Plastic pipe and tubing. Carter Products Corp., Cleveland, O.

Plicast — Refractories. Plibrico Jointless Firebrick Co., Chicago, Ill.

Plisulate—Insulating cement. Plibrico Jointless Firebrick Co., Chicago, Ill.

Plycrete—Pipe. Bridgeport Brass Co., Bridgeport, Conn.

Plymouth—Stokers. Clizbe Bros. Mfg. Co., Plymouth, Ind.

Ply-Tech—Plywood sheets and board. Technical Ply-Woods, Chicago, Ill.

Pneumatronic — Electronic and pneumatic temperature control equipment. Johnson Service Co., Milwaukee, Wis.

Poeco — Insulation. Poe Co., C. W., Cleveland, O.

Polartron—Relays, regulators, switches. Minneapolis - Honeywell Regulator Co., Minneapolis, Minn.

Porex—Porous metal. General Motors Corp., Moraine Products Div., Dayton, O.

Poro-Stone—Filters. Adams Co., R. P., Buffalo, N. Y.

Porto-Power — Pipe benders and pipe pushers. Blackhawk Mfg. Co., Milwaukee, Wis.

Porto Shears—Shears. Black & Decker Mfg. Co., Towson, Md.

Portovent—Hose. American Ventilating Hose Co., New York, N. Y.

Pottstown—Pumps. Allen Billmyre Co., Mamaroneck, N. Y.

Power—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.

Power Boy—Pipe cutting and threading machines. Oster Mfg. Co., Cleveland, O.

Powerbilt — Fans. Power Engineering Co., Chicago, Ill.

Powerflex — Flat belt drives. Gates Rubber Co., The, Denver, Colo.

Power-Flex—Stokers. Link-Belt Co., Chicago, Ill.

Power Master — Boilers. Orr & Sembower, Inc., Reading, Pa.

Power Pak—Boilers. Orr & Sembower, Inc., Reading, Pa.

Precipitron — Air cleaners. Westinghouse Electric & Mfg. Co., Cleveland, O.

Premier—Boilers, heaters. National Radiator Co., The Johnstown, Pa.

Premier—Welding rod. American Steel & Wire Co., Cleveland, O.

Pre-Notch — Ducts and duct fittings. Gray Metal Products, Inc., Rochester, N. Y.

Pressuretrol — Regulators, switches. Minneapolis - Honeywell Regulator Co., Minneapolis, Minn.

Prestal — Pipe benders. Tal's Prestal Bender, Inc., Milwaukee, Wis.

Prestico—Caulking compounds, furnace cement. Presstite Engineering Co., St. Louis, Mo.

Prest-O-Lite—Leak detectors, torches. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.

Presto-Lock — Couplings. Drinkwater, Inc., Chicago, Ill.

Prest-O-Weld — Welding and cutting apparatus. Linde Air Products Co., The, New York, N. Y.

Princo—Anemometers, gages, hygrometers, manometers, psychrometers, regulators, relays, thermometers, thermostats. Precision Thermometer and Instrument Co., Philadelphia, Pa.

Probestos—Gasket. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Prop-R-Temp—Air conditioning units. Ice-Air Conditioning Co., Inc., Brooklyn, N. Y.

Protectomotor — Air filters. Dollinger Corp., Rochester, N. Y.

Protectorelay — Relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Protectoring—Gaskets. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Protex — Water treatment. Apex Engineering Co., Chicago, Ill.

Proxlin—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.

Pryzoak — Belting. Graton & Knight Co., Worcester, Mass.

Pul-Air—Ventilators. Lyon, Conklin & Co., Inc., Baltimore, Md.

Pul Air—Ventilators. Penn Ventilating Co., Philadelphia, Pa.

Pul Air-Ridge—Ventilators. Penn Ventilating Co., Philadelphia, Pa.

Pulling—Circulators, pumps. Columbus Steam Pump Works Co., Columbus, O.

Pulverzone—Stokers. American Coal Burner Co., Chicago, Ill.

Punkah—Louvers and shutters. Kelvin-White Co., Boston, Mass.

Puridryer — Dehumidifiers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.

Pur-O-Fier — Air separators. Bird-White Co., Chicago, Ill.

Purox—Electrodes, welding and cutting apparatus. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.

Pyralux—Enamels and lacquers. du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept., Wilmington, Del.

Pyrex — Glass pipe, gage and sight glasses, heat exchangers, nozzles. Corning Glass Wks., Corning, N. Y.

Pyro—Thermometers, recorders, regulators. Pyrometer Instrument Co., New York, N. Y.

Pyroment—Cement. Keasbey & Mattison Co., Ambler, Pa.

Pyrotron—Recorders. Bailey Meter Co., Cleveland, O.

Q-Chromastic — Refractories. Quigley Co., Inc., New York, N. Y.

Q-Chrome—Refractories. Quigley Co., Inc., New York, N. Y.

QD—Sheaves. Worthington Pump & Machinery Corp., Harrison, N. J.

Q-Seal—Caulking compounds. Quigley Co., Inc., New York, N. Y.

Q-T—Insulation. Celotex Corp., The, Chicago, Ill.

QT—Unit heaters. Kisco Boiler & Engineering Co., St. Louis, Mo.

Quad—Cooling towers. Young Radiator Co., Racine, Wis.

Quad—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.

Quartzoid—Sprinkler heads. Grinnell Co., Inc., Providence, R. I.

Quiet May—Oil burners. May Oil Burner Corp., Baltimore, Md.

Quiet Zone—Blower wheels, fans. Palmer's Mfg. Corp., Phoenix, Ariz.

Quintuplet—Valves. Maid-O'-Mist, Inc., Chicago, Ill.

RBC—Roller bearings. Roller Bearing Co. of America, Trenton, N. J.

RB Pressure—Pressure blowers. Western Blower Co., Seattle, Wash.

RC—Couplings. Link-Belt Co., Indianapolis, Ind.

R & G—Grilles, registers. Register & Grille Mfg. Co., Brooklyn, N. Y.

R. I. 250—Unions. Rhode Island Fittings Co., Hillsgrove, R. I.

R-K—Combustion control systems, regulators, valves. Ruggles-Klingemann Mfg. Co., Salem, Mass.

R & M—Motors. Robbins & Myers, Inc., Springfield, O.

R & M Moyno—Pumps. Robbins & Myers, Inc., Springfield, O.

R-P Zeolite—Water tratment. Research Products Corp., Madison, Wis.

R. P. & C.—Fittings, valves. Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Bridgeport, Conn.

R-U-F—Fans. Reed Unit-Fans, Inc., New Orleans, La.

Race—Fans, heaters. Royal Air Conditioning Equipment Co., Alhambra, Calif.

Radial—Unit heaters. McQuay, Inc., Minneapolis, Minn.

Radialflow—Valves. Smolensky Valve Co., Inc., Bedford, O.

Radiant — Direct radiation. Burnham Boiler Corp., Irvington, N. Y.

Radiatherm—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Radi-Ion—Ionization apparatus. Montgomery Bros., San Francisco, Calif.

Radi-Vector—Radiation. Vulcan Radiator Co., Hartford, Conn.

Radolite—Cement, refractories. Pyrolite Products Co., Cleveland, O.

Raintite — Ventilators. Aeolus Dickinson, Chicago, Ill.

Rajah—Packing. Johns-Manville, New York, N. Y.

Ramapo—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.

Ramix — Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.

Ranarex—Analyzers, indicators, recorders. Permutit Co., New York, N. Y.

Rapid—Oil coolers. Bell & Gossett Co., Morton Grove, Ill.

Rapiduction — Pipe cutting machines. Oster Mfg. Co., Cleveland, O.

Rawl-Anchor — Bolts. Rawlplug Co., Inc., The, New York, N. Y.

Rawldrill—Drills for masonry. Rawlplug Co., Inc., The, New York, N. Y.

Rawl-Drive—Bolts. Rawlplug Co., Inc., The, New York, N. Y.

Rawl-Taper—Bolts. Rawlplug Co., Inc., The, New York, N. Y.

Raydiant—Radiation. Weil-McLain Co., Chicago, Ill.

Reading—Pipe, tubing. Pipe and Tube Products, Inc., New York, N. Y.

Reco—Accumulators, condensers, headers, heaters, preheaters, tanks, unit coolers. Richmond Engineering Co., Richmond, Va.

Reco—Controllers and starters, motors. Reynolds Electric Co., Chicago, Ill.

Reco Radi-Aire—Fans. Reynolds Electric Co., Chicago, Ill.

Record-O-Stat — Recorder - Controllers. Johnson Service Co., Milwaukee, Wis.

Recoy—Chillers, condensers, cooling surface, unit air conditioners and coolers. Refrigeration Economics Co., Inc., Canton, O.

Red—Operators, regulators, switches, valves. Cooper Co., Clark, Palmyra, N. J.

Red Devil — Furnace and pipe joint cement. Pecora Paint Co., Philadelphia, Pa.

Red Diamond—Pipe. American District Steam Co., North Tonawanda, N. Y.

Red Flash—Traps. Ellis Drier Co., Chicago, Ill.

Red Head—Tongs. Billings & Spencer Co., Hartford, Conn.

Red Head—Traps. Ellis Drier Co., Chicago, Ill.

Red-Reading-Mercury — Hygrometers, psychrometers, thermometers. Palmer Co., Cincinnati, O.

Red Socket—Wrenches. Lowell Wrench Co., Worcester, Mass.

Red Top — Humidistats, thermostats. H-B Instrument Co., Philadelphia, Pa.

Red Top—Valves. Neptune Meter Co., New York, N. Y.

Red Top—Insulation. United States Gypsum Co., Chicago, Ill.

Redi—Stokers. General Machinery Co., Spokane, Wash.

Redi-Return—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.

Redi-Vac — Pumps. American - Marsh Pumps, Inc., Battle Creek, Mich.

Reformend—Electrodes. Arcos Corp., Philadelphia, Pa.

Refrak Screen—Gas burners. Selas Corp. of America, Philadelphia, Pa.

Rego—Welding and cutting apparatus. Universal Power Corp., Cleveland, O.

Rego—Torches, welding and cutting apparatus. National Cylinder Gas Co., Chicago, Ill.

Relatrol—Heating systems. Automatic Temperature Control Co., Inc., Philadelphia, Pa.

Reliance—Regulators. American Meter Co., Inc., New York, N. Y.

Remote — Indicators. Yarnall-Waring Co., Philadelphia, Pa.

Renewo — Valves. Lunkenheimer Co., Cincinnati, O.

Renu-Vent—Air filters. American Air Filter Co., Inc., Louisville, Ky.

Research—Belting. Graton & Knight Co., Worcester, Mass.

Revolute—Blueprint machines. Paragon-Revolute Corp., Rochester, N. Y.

Revolving — Heaters. Wing Mfg. Co., L. J., New York, N. Y.

Revolving—Ventilators. Burt Mfg. Co., Akron, O.

Rex—Blower wheels, fans. Air Controls, Inc., Cleveland, O.

Rex—Chain drives, coal and ash conveyors, couplings, nozzles, pillow blocks, pumps. Chain Belt Co., Milwaukee, Wis.

Rex-AC—Bearings. Air Controls, Inc., Cleveland, O.

Rex-Airate—Roof ventilators, blower wheels. Air Controls, Inc., Cleveland, O.

Rex-Flex—Ducts. Chicago Metal Hose Corp., Maywood, Ill.

Rexoil—Burners, heaters. Reif-Rexoil, Inc., Buffalo, N. Y.

Rex-Tube—Duct connections. Chicago Metal Hose Corp., Maywood, Ill.

Rexvane—Fans. Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Corp., Hyde Park, Boston, Mass.

Rex-Weld—Hose, Chicago Metal Hose, Corp., Maywood, Ill.

Reyn-O-Cell — Insulation. Reynolds Metals Co., Richmond, Va.

Rhino—Caulking compounds. Pecora Paint Co., Philadelphia, Pa.

Richvar—Radiation. Richmond Radiator Co., Gas Products Div., Uniontown, Pa.

Rid-Al — Cleaning compounds, water treatment. Apex Engineering Co., Chicago, Ill.

Ridgid—Pipe machines, wrenches, cutters, vises. Ridge Tool Co., Elyria, O.

Rid-Sludge—Cleaning compounds, corrosion treatment. Apex All Weather Products, Chicago, Ill.

Rid-Sludge—Cleaning compounds. Apex Engineering Co., Chicago, Ill.

Rifco 300—Unions. Rhode Island Fittings Co., Hillsgrove, R. I.

Rihco—Humidifiers. Rhode Island Humidifier & Ventilating Co., Boston, Mass.

Rip-Clean—Filters. Research Products Corp., Madison, Wis.

Rip-pl—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.

Ripple-Fin—Cooling and heating surface. McQuay, Inc., Minneapolis, Minn.

Robinson—Brakes, punches. New Albany Machine Mfg. Co., New Albany, Ind.

Rocan—Copper sheets. Revere Copper and Brass, Incorporated, New York, N. Y.

Rocap—Heaters. Rome-Turney Radiator Co., Rome, N. Y.

Rodpax—Packing. National Engineering Products, Inc., Washington, D. C.

Ro-Flo — Compressors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Rolagrip — Couplings. Gustin Bacon Mfg. Co., Kansas City, Mo.

Roman Bronze — Welding rod. Revere Copper and Brass Incorporated, New York, N. Y.

Roofvane—Ventilators. Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.

Roof-Vent — Ventilators. Reed Unit-Fans, Inc., New Orleans, La.

Rotameter—Flow meters. Schutte & Koerting Co., Philadelphia, Pa.

Rotameter—Meters. Fischer & Porter Co., Hatboro, Pa.

Rota-Roll — Pumps. Sundstrand Machine Tool Co., Pump Div., Rockford, Ill.

Roto Blast—Furnaces. Moncrief Furnace Co., Atlanta, Ga.

Roto-Clone—Dust collectors. American Air Filter Co., Inc., Louisville, Ky.

Rotohood—Ventilators. Uno Ventilator Co., Cliftondale, Mass.

RotoJet — Spray nozzles. Binks Mfg. Co., Chicago, Ill.

Roto-louvre — Dryers. Link-Belt Co., Chicago, Ill.

Roto-trol—Liquid pressure regulators and switches. Healy Ruff Co., St. Paul, Minn.

Ro-Twin—Air compressors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Roxaprene—Protective coatings. Roxalin Flexible Finishes, Inc., Elizabeth, N. J.

Roxite—Pipe. United States Stoneware Co., New York, N. Y.

Roxyn C—Enamels and lacquers, protective coatings. Roxalin Flexible Finishes, Inc., Elizabeth, N. J.

Rubalt—Enamels and lacquers. Hague & Co., Alfred, Brooklyn, N. Y.

Rubatex—Insulation. Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.

Rubyfluid—Solder. Ruby Chemical Co., Columbus, O.

Runwel—Packing. Greene, Tweed & Co., New York, N. Y.

Rusco—Insulation. Russell Co., F. C., The, Cleveland, O.

Rusthuster—Cleaning compounds. Cannon Chemical Co., Everett, Mass.

Rydlyme — Cleaning compounds. Apex Engineering Co., Chicago, Ill.

S-A — Conveyors, feeders. Stephens-Adamson Mfg. Co., Aurora, Ill.

SA—Valves. Lunkenheimer Co., Cincinnati, O.

S. C.—Air heaters, gas burners. Surface Combustion Corp., Toledo, O.

S-N—Air conditioning units, burners, fans, heaters, pumps, stokers. Scott-Newcomb, Inc., St. Louis, Mo.

SOH—Boilers. Titusville Iron Works Co., Titusville, Pa.

S & P—Burners, governors, preheaters, regulators, strainers, valves. Staples & Pfeiffer, San Francisco, Calif.

S. R. P.—Protective coatings. Sonneborn Sons, Inc., L., New York, N. Y.

Saco—Speed reducers. Stephens-Adamson Mfg. Co., Aurora, Ill.

Saf-Dry—Refrigerants. Liquid Carbonic Corp., The, Chicago, Ill.

Saint Louis — Stokers. Ormsby-Osterman, Inc., St. Louis, Mo.

Safety—Heaters. Wing Mfg. Co., L. J., New York, N. Y.

Sal-Mo—Cement, insulation, packing. Sall Mountain Co., Chicago, Ill.

Sanidaire — Humidifiers. United States Air Conditioning Corp., Minneapolis, Minn.

Santocel—Insulation. Monsanto Chemical Co., Merimac Div., Everett, Mass.

Santosite—Water treatment. Monsanto Chemical Co., St. Louis, Mo.

Santrol—Registers. Tuttle & Bailey, Inc., New Britain, Conn.

Saran — Fittings, pipe. American Hard Rubber Co., New York, N. Y.,

Saran—Plastic pipe and tubing. Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill.

Saran — Plastic fittings and tubing. Hodgman Rubber Co., Framingham, Mass.

Saran—Plastic pipe and tubing. Skuttle Mfg. Co., Detroit, Mich.

Saunders — Pipe cutters. Erie Tool Works, Erie, Pa.

Sauter—Time switches. Cramer Co., Inc., R. W., The, Centerbrook, Conn.

Schwan—Gas burners. Jamieson Mfg. Co., Dallas, Texas.

Scotch Giant—Refrigerating compressors. General Electric Co., Air Conditioning Dept., Bloomfield, N. J.

Scroll-Pivoter—Shears. Wiss & Sons Co., J., Newark, N. J.

Scrulin — Bolts. Star Expansion Bolt Co., New York, N. Y.

Scru-peller — Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.

Sealdflow—Cooling towers. Pritchard & Co., J. F., Equipment Div., Kansas City Mo.

Seal Master—Bearings. Stephens-Adamson Mfg. Co., Aurora, Ill.

Seal-Less — Compressors. Westinghouse Electric Corp., Springfield, Mass.

Seal-Rite — Cement and compounds. Macksons Co., New York, N. Y.

Searchray — X-ray machines. North American Philips Co., Inc., New York, N. Y.

Security — Caulking compounds. National Mfg. Corp., Tonawanda, N. Y.

Segweld—Pipe fittings. Gustin Bacon Mfg. Co., Kansas City, Mo.

Selgelite — Gaskets. Johns-Manville, New York, N. Y.

Seismo-Dampers—Bases. Korfund Co., Inc., Long Island City, N. Y.

Selectair—Air conditioning units. Johnson Co., S. T., Oakland, Calif.

Sells—Bearings. Royersford Foundry & Machine Co., Royersford, Pa.

Sensatherm — Thermostats. Mercoid Corp., Chicago, Ill.

Sensitrol — Relays. Weston Electrical Instrument Corp., Newark, N. J.

Sentinel—Pumps. Red Jacket Mfg. Co., Davenport, Ia.

Serrabestos—Gaskets. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Service—Packing. Johns-Manville, New York, N. Y.

Serviron—Coatings. Saverite Engineering Co., Hoboken, N. J.

Sesure — Gages. Yarnall-Waring Co., Philadelphia, Pa.

"77" — Pipe coverings. Eagle-Picher Co., Cincinnati, O.

Shawco—Bends, headers. Shaw Co., Benjamin F., Wilmington, Del.

Sheetrock—Sheets and board for ducts. United States Gypsum Co., Chicago, Ill.

Shelby — Tubing. National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.

Shield-Arc — Electrodes, arc welders. Lincoln Electric Co., Cleveland, O.

Shone—Sewage ejectors. Yeomans Bros. Co., Chicago, Ill.

Shut-O-Vent — Louvers and shutters. Reed Unit-Fans, Inc., New Orleans, La.

Silent Air — Fans. Belanger Fan & Blower Co., Detroit, Mich.

Silentaire — Window ventilator units. Berger Mfg. Div., Republic Steel Corp., Canton, O.

Silent-Auburn — Burners, heaters, air conditioning units. Auburn Burner Co., Auburn, Ind.

Silentblu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.

Silent-Breeze — Propeller fans. Holcomb & Hoke Mfg. Co., Indianapolis, Ind.

Silentvane — Fans. Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.

Sil-Fos—Solder. Handy & Harman, New York, N. Y.

Silicair—Insulation. Western Silicair Products, Inc., Burbank, Calif.

Silverlink—Chain drives. Link-Belt Co., Indianapolis, Ind.

Silver Magic — Welding compounds. Universal Power Corp., Cleveland, O.

Silverseal—Packing. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Silverstreak — Chain drive. Link-Belt Co., Indianapolis, Ind.

Silver Stream—Spray nozzles. Skinner Irrigation Co., Troy, O.

Silvertop—Eliminators, traps. Anderson Co., V. D., The, Cleveland, O.

Simplex — Gages. Viking Pump Co., Cedar Falls, Ia.

Simplex—Pipe vises. Desmond-Stephan Mfg. Co., Urbana, O.

Simplex — Regulators, tanks. Bell & Gossett Co., Morton Grove, Ill.

Sim-Trol—Controls. Simplex Mfg. Co., Fond du Lac, Wis.

Sirocco—Blowers, dust collectors, fans, unit air conditioners, unit air coolers, unit air humidifiers, air washers. American Blower Corp., Detroit, Mich.

695 Plastic — Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.

SkilDrill — Drills. Skilsaw, Inc., Chicago, Ill.

SkilShear—Shears. Skilsaw, Inc., Chicago, Ill.

Skip-Tooth—Dies. Nye Tool & Machine Co., Chicago, Ill.

Slugin—Bolts. Star Expansion Bolt Co., New York, N. Y.

Smith-Dolan—Electric preheaters and stress relievers. Electric Arc, Inc., Newark, N. J.

Smith-Midget—Direct radiation. Smith Co., Inc., H. B., Westfield, Mass.

Smith-Mills — Boilers. Smith Co., Inc., H. B., Westfield, Mass.

Smokotrol—Smoke Alarms. Power Engineering Co., Chicago, Ill.

Snapin — Bolts. Star Expansion Bolt Co., New York, N. Y.

Snap-Rite — Ducts and duct fittings. Gray Metal Products, Inc., Rochester, N. Y.

Sno-Breze — Air conditioning units, cooling surface. Palmer Mfg. Corp., Phoenix, Ariz.

Snug—Radiation. Weil-McLain Co., Chicago, Ill.

Softweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Solray — Radiation. Weil-McLain Co., Chicago, Ill.

Sol-vet — Cleaning compounds, water treatment. Anderson-Stolz Corp., Kansas City, Mo.

Sono-O-Seal—Insulation. General Insulating Products Co., Brooklyn, N. Y.

Soundliner — Insulation. Baldwin-Hill Co., Trenton, N. J.

Sovereign—Packing. Darcoid Co., Inc., New York, N. Y.

Spatter Nox—Welding compounds. Universal Power Corp., Cleveland, O.

Spatter Off—Welding compounds. Universal Power Corp., Cleveland, O.

Spartan—Packing. Graton & Knight Co., Worcester, Mass.

Special X—Solder. Industrial Service Laboratories, Milwaukee, Wis.

Spee-Dee—Blue print and white print machines. Peck & Harvey, Chicago, Ill.

Speed-Flex—Flat belt drives. Gates Rubber Co., The, Denver, Colo.

Speed Heater—Unit heaters. Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.

Speed-Jack—Changers. The American Pulley Co., Philadelphia, Pa.

Speed Nuts — Locknuts. Tinnerman Products, Inc., Cleveland, O.

Speed Prime—Pumps. Chain Belt Co., Milwaukee, Wis.

Speedare—Electrodes. Universal Power Corp., Cleveland, O.

Sphero—Plug valves. Fairbanks Co., New York, N. Y.

Spider Web—Air filters. Wilson & Co., Chicago, Ill.

Spiradome—Spray nozzles. Fluor Corp., Ltd., The, Los Angeles, Calif.

Spiralwound—Gaskets. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Spiratube — Ducts and duct fittings. Warner Bros. Co., Spiratube Div., Bridgeport, Conn.

Spiralweld—Pipes. Naylor Pipe Co., Chicago, Ill.

Spiro—Heaters. Stout & Sons, David, St. Louis, Mo.

Spirodome — Spray nozzles. Cooling Tower Co., Inc., The, Div. of the Fluor Corp., Ltd., New York, N. Y.

Spirotallic — Gaskets. Johns-Manville, New York, N. Y.

Spirovane—Fans. Western Blower Co., Seattle, Wash.

Spraco—Nozzles, separators, strainers, washers. Spray Engineering Co., Somerville, Mass.

Spra-Rite — Nozzles. Binks Mfg. Co. Chicago, Ill.

Spray-Acoustic — Insulation. Sprayo Flake Co., Chicago, Ill.

Springin—Bolts. Star Expansion Bolt Co., New York, N. Y.

Stabilflo — Valves. Foxboro Co., Foxboro, Mass.

Stacon — Regulators, valves. Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.

Sta-Gloss—Steel sheets. Jessop Steel Co., Washington, Pa.

Staidare—Electrodes. Universal Power Corp., Cleveland, O.

Stainare—Electrodes. Universal Power Corp., Cleveland, O.

Stainlend — Electrodes. Arcos Corp., Philadelphia, Pa.

Stainless — Cement and compounds. Grinnell Co., Inc., Providence, R. I.

Stainweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Standard—Ventilators. Burt Mfg. Co., Akron, O.

Standforated—Grilles. Standard Stamping & Perforating Co., Chicago, Ill.

Star—Ventilators. Merchant & Evans Co., Philadelphia, Pa.

Staxnuster — Roof ventilators. Allen Corp., Detroit, Mich.

Staynew—Filters. Dollinger Corp., Rochester, N. Y.

Stazin—Bolts. Star Expansion Bolt Co., New York, N. Y.

Steelok — Packing. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Sterilamp—Lamps. Westinghouse Electric & Mfg. Co., Bloomfield, N. J.

Sterlco—Controls, eliminators, pumps, strainers, heating systems, traps, valves. Sterling, Inc., Milwaukee, Wis.

Sterling — Compressors, condensers, valves. Reynolds Mfg. Co., Inc., Springfield, Mo.

Stietite—Cement. Refractory & Insulation Corp., New York, N. Y.

Stillson — Pipe wrenches. Erie Tool Works, Erie, Pa.

Stokerator—Stokers. Northern Steel & Stoker Corp., Peoria, Ill.

Stokerelay—Relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Streamaire — Unit heaters, radiation, cooling surface. Young Radiator Co., Racine, Wis.

Steamjet — Spray nozzles. Spraying Systems Co., Chicago, Ill.

Strahman—Boiler gage cocks. Klingerit Inc., New York, N. Y.

Streamline—Couplings, cutters, fittings, heat exchangers, manifolds, nipples, pipe, strainers, tubing, unions, valves. Mueller Brass Co., Port Huron, Mich.

Striatube — Plastic pipe and tubing. Carter Products Corp., Cleveland, O.

Stronghold—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.

Stud-Pak — Insulation. United States Mineral Wool Co., Chicago, Ill.

Sturdybender—Power brakes. Bath Co., Cyril, The, Cleveland, O.

Submersion — Boilers, water heaters. Stout & Sons, David, St. Louis, Mo.

Sullare — Electrodes. Universal Power Corp., Cleveland, O.

Sunrad—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Sunray — Boilers, radiation. United States Radiator Corp., Detroit, Mich.

Super Air Screws — Fans. Marathon Electric Mfg. Corp., Wausau, Wis.

Super Seal—Fittings. Grinnell Co., Inc., Providence, R. I.

Super "66" — Insulation. Eagle-Picher Co., Cincinnati, O.

Super 7—V belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Super Silvertop—Traps. Anderson Co., V. D., The, Cleveland, O.

Super Thermo Stucco—Cement. Chicago Fire Brick Co., Chicago, Ill.

Super X — Copper sheets. Western Brass Mill Div., Olin Industries, Inc., East Alton, Ill.

Super X—Coatings. Nelson Mfg. Co., B. F., Minneapolis, Minn.

Supercord—V belts. Browning Mfg. Co., Inc., Maysville, Ky.

Supercutno—Packing. Greene, Tweed & Co., New York, N. Y.

Super-deLavaud—Pipe. U. S. Pipe & Foundry Co., Burlington, N. J.

Superector—Wrenches. Williams & Co., J. H., Buffalo, N. Y.

Superex — Insulation. Johns-Manville, New York, N. Y.

Super-Fan—Fan blades. Norwin Co., Freeport, Ill.

Superflex — Drives. Gates Rubber Co., The, Denver, Colo.

Superflux—Solder. Lewis Laboratories, Inc., Paul, Milwaukee, Wis.

Superheat—Gas burners. Selas Corp. of America, Philadelphia, Pa.

Superior—Fans. American Foundry & Furnace Co., Bloomington, Ill.

Superior — Wrenches. Williams & Co., J. H., Buffalo, N. Y.

Superjustable — Adjustable wrenches. Williams & Co., J. H., Buffalo, N. Y.

Super-Power—Drives. Baldwin Belting, Inc., New York, N. Y.

Superratchet—Ratchet Wrenches. Williams & Co., J. H., Buffalo, N. Y.

Superrench—Wrenches. Williams & Co., J. H., Buffalo, N. Y.

Super-S—Gages. Klingerit, Inc., New York, N. Y.

Supersocket—Wrenches. Williams & Co., J. H., Buffalo, N. Y.

Supertan—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.

Supertemp — Insulation. Eagle-Picher Co., Cincinnati, O.

Supertherm—Systems. Ross Engineering Corp., J. O., New York, N. Y.

Sure Return — Condensation return pumps. Chicago Pump Co., Chicago, Ill.

Surevent — Valves. Gorton Heating Corp., Cranford, N. J.

Surlock—Registers. Tuttle & Bailey, Inc., New Britain, Conn.

Swendeman—Air separators. Leavitt Machine Co., Orange, Mass.

Syphon — Bellows, joints, operators, regulators, valves. Fulton Syphon Co., Knoxville, Tenn.

Synchro-Lectric—Viscosimeters. Brookfield Engineering Laboratories, Sharon, Mass.

Synchro-Meter—Meters. Bailey Meter Co., Cleveland, O.

Synchron — Motors. Hansen Mfg. Co., Inc., Princeton, Ind.

Synchrotie — Recorders. Westinghouse Electric Corp., East Pittsburgh, Pa.

Syneretizer—Unit ventilators. Nesbitt, Inc., John J., Philadelphia, Pa.

Syndolag—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.

Syphonaire—Ventilators. Western Engineering & Mfg. Co., Los Angeles, Calif.

T.T.—Smoke guns. Hill, E. Vernon, Chicago, Ill.

Tabasco — Water heaters. Kewanee Boiler Corp., Kewanee, Ill.

Tag—Humidistats, hygrometers, manometers, meters, psychrometers, recorders, regulators, thermometers, traps, valves. Tagliabue Div., C. J. Portable Products Corp., Brooklyn, N. Y.

Tampico — Air filters. Chicago Filter Co., Joliet, Ill.

Tampin — Bolts. Star Expansion Bolt Co., New York, N. Y.

Tank-O-Meter — Gages, indicator-controllers, indicators. Uehling Instrument Co., Paterson, N. J.

Tanktrol—Regulators. Automatic Control Co., St. Paul, Minn.

Tannate—Belting, packing. Rhoads & Sons, J. E., Philadelphia, Pa.

Tannate-Rockwood — Belt drives. Rhoads & Sons, J. E., Philadelphia, Pa.

Tanseal—Packing. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Techni-Louvre—Vanes. Waterloo Register Co., Div. of Associated Manufacturers, Inc., Waterloo, Ia.

Teksag Colicid — Boiler compounds. American Teksag Products Co., Inc., Mount Vernon, N. Y.

Telemaster — Relays Tork Clock Co., Inc., Mt. Vernon, N. Y.

Televisor—Gages. Schutte & Koerting Co., Philadelphia, Pa.

Tellevel—Indicators, switches. Stephens-Adamson Mfg. Co., Aurora, Ill.

Teltru—Anemometers, gages. Hill, E. Vernon, Chicago, Ill.

Tem-Clock (Electric)—Time switches. Penn Electric Switch Co., Goshen, Ind.

Temlok—Insulation. Armstrong Cork Co., Lancaster, Pa.

Temperator — Unit air conditioners. Dunham Co., C. A., Chicago, Ill.

Tempryte — Windows. Truscon Steel Co., Youngstown, O.

Temtrol — Thermostats. Penn Electric Switch Co., Goshen, Ind.

Tensulate—Cement, insulation. Tennessee Products Corp., Nashville, Tenn.

Texiron—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Texrope — V-belt drives, pulleys, v-belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Texsteel—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Texslide—Motor bases. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Tharco—Cement. The Armstrong Co., Detroit, Mich.

Thawzone—Dehydrant and acid neutralizer. Highside Chemicals Co., Newark, N. J.

Therhumiter—Thermometers. Weksler Thermometer Corp., New York, N. Y.

Thermalün—Unit coolers. Thermal Co., Inc., Milwaukee, Wis.

Thermalfuel — Furnaces. Beck Engineering Combustion Kompany, St. Louis, Mo.

Thermascrete—Refractories. Munn and Steele, Inc., Newark, N. J.

Therm-Cote—Radiation. Extended Surface, Div. of David E. Kennedy, Inc., Brooklyn, N. Y.

Thermek—Heating and cooling surface Peerless of America, Inc., Chicago, Ill.

Thermidaire—Burners, furnaces, heaters. Campbell Heating Co., E. K., Kansas City, Mo.

Thermix Dust collector. Prat-Daniel Corp., Port Chester, N. Y.

Thermo—Expansion valves. Alco Valve Co., St. Louis, Mo.

Thermo — Heaters. American Furnace Co., St. Louis, Mo.

Thermocheck—Controls. Bell & Gossett Co., Morton Grove, Ill.

Thermo-Draulic — Regulators. Perfex Corp., Milwaukee, Wis.

Thermodrive — Speedchangers, pulleys and sheaves. Webster Electric Co., Racine, Wis.

Thermoflex — Strainers, heating systems, traps, valves. Cashin Co., W. D., Boston, Mass.

Thermoflo—Valves. Bell & Gossett Co., Morton Grove, Ill.

Thermo-Flow—Heat exchangers. Thermal Industries, Indio, Calif.

Thermogage — Thermometers. Hotstream Heater Co., Cleveland, O.

Thermogas — Furnaces, unit heaters. Beck Engineering Combustion Kompany, St. Louis, Mo.

Thermo Grip—Torches. Ideal Commutator Dresser Co., Sycamore, Ill.

Thermoguide — Thermometers. Taylor Instrument Companies, Rochester, N. Y.

Thermohm — Psychrometers. Leeds & Northrup Co., Philadelphia, Pa.

Thermo-Humidigraph — Recorder-controllers. Bristol Co., The, Waterbury, Conn.

Thermoil—Furnaces, unit heaters. Beck Engineering Combustion Kompany, St. Louis, Mo.

Thermolator—Valves. Triplex Heating Specialty Co., Peru, Ind.

Thermolier—Unit heaters. Grinnell Co. Inc., Providence, R. I.

Thermopane—Windows. Libbey-Owens-Ford Glass Co., Toledo, O.

Therm-o-tile—Conduit. Porter & Co., Inc., H. W., Newark, N. J.

Thermotrol—Valves. Sterling Engineering Co., Milwaukee, Wis.

Thermovent—Unit ventilators. Nesbitt, Inc., John J., Philadelphia, Pa.

Thermovoir — Water heaters. Bell & Gossett Co., Morton Grove, Ill.

Thin Man—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Thor—Belting. Goodyear Tire & Rubber Co., Akron, O.

Thor—Drills, pumps, reamers, shears. Independent Pneumatic Tool Co., Chicago, Ill.

Thorobred—V belts and v belt drives. Dayton Rubber Mfg. Co., Dayton, O.

Thredolets—Fittings. Bonney Forge & Tool Wks., Allentown, Pa.

3C — Motor controls. Clark controller Co., Cleveland, O.

Thrift—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.

Throwny—Air filters. American Air Filter Co., Inc., Louisville, Ky.

Thy-mo-trol — Adjustable speed electronic motor drive. General Electric Co., Schenectady, N. Y.

Tilt Trap—Steam traps. Nason Co., Detroit, Mich.

Tilco-Fin—Heating and cooling surface. Extended Surface Div. of David E. Kennedy, Inc., Brooklyn, N. Y.

Time Saver—Damper regulators. Goess Mfg. Co., Milwaukee, Wis.

Timercold — Time switches. Mercoid Corp., Chicago, Ill.

Timereiay—Relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Timetrol (Manual) — Time switches. Penn Electric Switch Co., Goshen, Ind.

Tin-Ezy—Coatings, solder and flux. Johnson Co., Lloyd S., Chicago, Ill.

Tin-Loy — Solder. Eagle-Picher Co., Cincinnati, O.

Tiny—Traps. Nason Co., Detroit, Mich.

Titan—Traps. Nason Co., Detroit, Mich.

Tite — Caulking compounds. Krehbiel Co., J. H., Chicago, Ill.

Tite Seal—Cement and compounds. Radiator Specialty Co., Charlotte, N. C.

Tom Thumb — Pipe machines. Oster Mfg. Co., Cleveland, O.

Toncan—Pipe, sheets. Republic Steel Corp., Cleveland, O.

Toolarc—Electrodes. Universal Power Corp., Cleveland, O.

Toolweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Torkflash—Wrenches. Blackhawk Mfg. Co., Milwaukee, Wis.

Torpedo — Accumulators, filters. Imperial Brass Mfg. Co., Chicago, Ill.

Torqometer — Torque indicating wrenches. Snap-On Tools Corp., Kenosha, Wis.

Transaxil—Flame failure controls. Mettler Co., Lee B., Los Angeles, Calif.

Trace — Refrigerant leak detectors. Highside Chemicals Co., Newark, N. J.

Transite — Conduit, pipe, refractories, sheets and board. Johns-Manville, New York, N. Y.

Trans-Lux — Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.

Transparent — Analyzers, gages, manometers. Dwyer Mfg. Co., F. W., Chicago, Ill.

Trap-Dri — Dehydrators. Automatic Products Co., Milwaukee, Wis.

Trap-It — Filters. Automatic Products Co., Milwaukee, Wis.

Trap Nest — Insulation. Wilson, Inc. Grant, Chicago, Ill.

Tray—Cooling towers, condensers. New England Cooling Tower Co., Boston, Mass.

Treet-O-Control — Steam system and water treatment. % Proportioneers, Inc. %, Providence, R. I.

Treet-O-Unit—Feeders, pumps. % Proportioneers, Inc. %, Providence, R. I.

Triad—Stocks and dies. Nye Tool & Machine Co., Chicago, Ill.

Tri-Clad—Motors. General Electric Co., Schenectady, N. Y.

Trident—Meters. Neptune Meter Co., New York, N. Y

Tri-Flux—Solder. Wolfe-Kote Co., She-

Trimo—Cutters, tongs, vises, wrenches. Trimount Mfg. Co., Boston, Mass.

Trimo—Cutters. Erie Toolworks, Erie, Pa.

Trimtherm—Thermostats. General Controls Co., Glendale, Calif.

Triple-A—Enamels and lacquers, protective coatings. Quigley Co., Inc., New York, N. Y.

Triple Duty—Heating systems. Bell & Gossett Co., Morton Grove, Ill.

Triple-Seal — Fittings. Imperial Brass Mfg. Co., Chicago, Ill.

Triplex—Stocks and dies. Nye Tool & Machine Co., Chicago, Ill.

Tripl-Mix—Cement. Krehbiel Co., J. H., Chicago, Ill.

Tri-Rotor—Pumps. Yale & Towne Mfg. Co., Stamford, Conn.

Tri-Sil—Dampers. Tuttle & Bailey, Inc., New Britain, Conn.

Tri-trol—Regulators, switches, thermostats. Marsh Heating Equipment Co., Chicago, Ill.

Triumph—Gaskets. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Triumph—Liquid level gages and indicators. Boston Auto Gage Co., Pittsfield, Mass.

Trojan—Boilers. Burnham Boiler Corp., Irvington, N. Y.

Trojan—Stokers. Auburn Burner Co., Auburn, Ind.

Truflex—Bi-metals. General Plate Div., Metals & Controls Corp., Attleboro, Mass.

Trulinadiant — Gas burners. Sullivan Valve & Engineering Co., Butte, Mont.

Trumark—Protractor for marking pipe. Tru-Line Corp., Los Angeles, Calif.

Try-Me—Regulators, strainers, valves. Tryco Products, Inc., Westfield, Mass.

Tubejet—Ejector type vacuum pump. Wheeler Mfg. Co., C. H., Philadelphia, Pa.

Tube-Loy—Lead alloy tubing. American Smelting & Refining Co., New York, N. Y.

Tube Master—Flaring tools. Leonard Precision Products Co., Garden Grove, Calif.

Tuf-flex — Gage and sight glasses. Libbey-Owens Ford Glass Co., Toledo, Ohio.

Tuf-On—Protective coatings. Wipe-On Corp., New York, N. Y.

Tulox—Plastic pipe and tubing. Extruded Plastics, Inc., Norwalk, Conn.

Turbo — Air washers, spray nozzles. Bayley Blower Co., Milwaukee, Wis

Turbo Vane—Fans and blowers. B. F. Sturtevant Co., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.

Turbulaire—Dryers. Western Precipitation Corp., Los Angeles, Calif.

Turret — Pumps. Yeomans Bros. Co., Chicago, Ill.

Tuway—Strainers. Wright-Austin Co., Detroit, Mich.

20th Century—Bearings. Roller Bearing Co. of America, Trenton, N. J.

Twin Contact—Controls. Perfex Corp., Milwaukee, Wis.

Twin G-Fin — Preheaters. Griscom-Russell Co., The, New York, N. Y.

Twin Seal—Check valves, gage testers. Mansfield & Green, Cleveland, O.

Two Way—Dampers. Tuttle & Bailey Inc., New Britain, Conn.

Tygon — Protective coatings, plastic tubing. U. S. Stoneware Co., New York, N. Y.

Tylox—Pipe couplings. United States Stoneware Co., New York, N. Y.

Tymit—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.

Tymotherm—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.

Typhoon — Chillers, coils, condensers, coolers, fans, air conditioning units, air washers. Ice Air Conditioning Co., New York, N. Y.

Tytecote — Insulation. Specialty Converters, Inc., East Braintree, Mass.

U. F. S.—Clamps. Grinnell Co., Inc., Providence, R. I.

U. S.—Unions. United Superior Union Co., Inc., Brooklyn, N. Y.

U. S.—Valves. Powell Co., Wm., Cincinnati, O.

U. S. S.—Angles, sheets. Carnegie-Illinois Steel Corp., Pittsburgh, Pa.

U-S-S—Shapes, sheets. Columbia Steel Co., San Francisco, Calif.

USS—Sheets, structural shapes. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

U. S. Airco — Air conditioning equipment, blowers, condensers, United States Air Conditioning Corp., Minneapolis, Minn.

UTA—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.

U-Loy—Sheets. Republic Steel Corp., Cleveland, O.

Unafio — Steam engines. Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.

Unamatic — Automatic arc welding equipment. Una Welding, Inc., Cleveland, O.

Unarco—Insulation. Union Asbestos & Rubber Co., Cicero, Ill.

Unibestos—Insulation. Union Asbestos & Rubber Co., Cicero, Ill.

Unicoils—Air conditioning unit. Clarage Fan Co., Kalamazoo, Mich.

Uniduct—Ducts and duct fittings. General Heating Products Co., Minneapolis, Minn.

Uni-fin—Grilles, registers. Barber-Colman Co., Rockford, Ill.

Uni-fin—Air diffusers, dampers, grilles Barber-Colman Co., Rockford, Ill.

Union—Valves. Powell Co., Wm., Cincinnati, O.

Unipack — Welding fume exhausters. American Machine Products Co., Marshalltown, Ia.

Uniplastic—Furnace and insulating cement. Robinson Insulation Co., Great Falls, Mont.

Unishears — Electric shears. Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.

Unisorb — Bases and pads, insulation. Felters Co., Inc., Boston, Mass.

Unitaire—Unit air conditioners. Westinghouse Electric Corp., Springfield, Mass.

Unitem—Heaters. Bell & Gossett Co., Morton Grove, Ill.

Unitherm—Unit heaters and coolers. Clarage Fan Co., Kalamazoo, Mich.

Unitrol—Regulators, switches, thermostats. Marsh Tritrol Co., Chicago, Ill.

Unitrol—Valves. Kieley, Mueller, Inc., North Bergen, N. J.

Universal—Benders. Hossfeld Mfg. Co., Winona, Minn.

Universal — Cast iron pipe. Central Foundry Co., New York, N. Y.

Universal—Centrifugal pumps. Bell & Gossett Co., Morton Grove, Ill.

Universal—Gas and oil burners. Mettler Co., Lee B., Los Angeles, Calif.

Universal — Packing. Johns-Manville, New York, N. Y.

Universal—Pipe cutters. Nye Tool & Machine Co., Chicago, Ill.

Universal—Regulators. Dockson Corp., Detroit, Mich.

Universal—Vibration eliminators. Vibration Control Co., New York, N. Y.

Universal Unaflow — Engines. Skinner Engine Co., Erie, Pa.

Upson—Bolts and studs. Republic Steel Corp., Bolt & Nut Div., Cleveland, O.

Utility — Compressors. Schramm, Inc., West Chester, Pa.

Utility—Heaters. Wing Mfg. Co., L. J., New York, N. Y.

Utilus — Fans. Hirschman-Pohle Co., Inc., LeRoy, N. Y.

Vacu-Draft — Blowers. Muncie Gear Wks., Inc., Muncie, Ind.

Vacuumstat — Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Valcalox — Damper regulators. Young Regulator Co., Cleveland, O.

Valpit — Unions. Pittsburgh Valve & Fittings Corp., Barberton, O.

Valvactor—Valve operators. Foxboro Co., Foxboro, Mass.

Vaporstat — Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Varipitch—Pulleys and sheaves. Gates Rubber Co., The, Denver, Colo.

Vari-Pitch — Speed changers, pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Vedoc—Enamels and lacquers. Ferro-Enamel Corp., Liquid Plastics Div., Cleveland, O.

Vee Jet—Spray nozzles. Spraying Systems Co., Chicago, Ill.

Veelos—V-belts. Manheim Mfg. & Belting Co., Manheim, Pa.

Velometer—Air velocity meters. Illinois Testing Laboratories, Inc., Chicago, Ill.

Velvet—Cement. Keasbey & Mattison Co., Ambler, Pa.

Vent-Vac—Heating systems. Anderson Products, Inc., Cambridge, Mass.

Vento—Traps. Haines & Co., William S., Philadelphia, Pa.

Vent-Rite—Air valves. Anderson Products, Inc., Cambridge, Mass.

Ventura—Fans. American Blower Corp., Detroit, Mich.

Venturafin — Unit heaters. American Blower Corp., Detroit, Mich.

Venturi — Fan housings. Commercial Shearing & Stamping Co., Youngstown, O.

Venturi — Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.

Venturi-Flo — Air diffusers. Barber-Colman Co., Rockford, Ill.

Verco—Insulating cement. Nelson Mfg. Co., B. F., Minneapolis, Minn.

Vercoustic — Insulation. Nelson Mfg. Co., B. F., Minneapolis, Minn.

Vermiculite — Insulation. International Vermiculite Co., Girard, Ill.

Vernier-Set—Time switches. Automatic Temperature Control Co., Inc., Philadelphia, Pa.

Versa-Tool—Electric drills. York Electric & Machine Co., York, Pa.

Vertiflow—Unit heaters. Young Radiator Co., Racine, Wis.

Vertivent—Ventilators. Young Radiator Co., Racine, Wis.

Vescote—Coatings. Vesco Corp., New York, N. Y.

V-Flat—Pulleys and sheaves. Dayton Rubber Mfg. Co., Dayton, O.

Vibracork — Bases. Armstrong Cork Co., Lancaster, Pa.

Vibrasorber—Vibration absorbers. Chicago Metal Hose Corp., Maywood, Ill.

Vibro-Bar—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.

Vibro-Dampers — Bases. Korfund Co., Long Island City, N. Y.

Vibro Insulators—Bases. Goodrich Co., B. F., Akron, O.

Vibro-Isolator—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.

Victor — Steam traps. Wright-Austin Co., Detroit, Mich.

Victory—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Victron—Electric motors, louvers and shutters, propeller fan blades and fans. Victor Electric Products, Inc., Cincinnati, O.

Vim—Gaskets, leather packing. Houghton & Co., E. F., Philadelphia, Pa.

Vim Tred—Leather belting. Houghton & Co., E. F., Philadelphia, Pa.

Visaflame—Controls. Mercoid Co., The, Chicago, Ill.

Visoleak—Detectors. Western Thermal Equipment Co., Los Angeles, Calif.

Vistand—Vise stands. Armstrong Mfg. Co., Bridgeport, Conn.

Vitalaire—Air conditioning units. Ice Cooling Appliance Corp., Morrison, Ill.

Vitalloy—Wrenches. Billings & Spencer Co., Hartford, Conn.

Vitra-Carlite — Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.

Vitriram—Furnace cement. U. S. Stoneware Co., New York, N. Y.

Vix-Syn—Rubber and synthetic packing. Houghton & Co., E. F., Philadelphia, Pa.

V-Meth-L — Refrigerant. Virginia Smelting Co., West Norfolk, Va.

Voladjuster — Dampers. Barber-Colman Co., Rockford, Ill.

Volcano—Ventilators. Iwan Brothers, South Bend, Ind.

Volocitrol — Louvers, regulators. Barber-Colman Co., Rockford, Ill.

Vol-U-Trol — Dampers. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Vornadofan—Fans. Sutton Corp., O. A., Beacon Bldg., Wichita, Kan.

Vortex—Pumps. Lawrence Pump & Engine Co., Lawrence, Mass.

Vortex—Nozzles. Phillips Cooling Tower Co., Inc., New York, N. Y.

V-lite — Gaskets. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

V-to-V—Pulleys and sheaves. Dayton Rubber Mfg. Co., Dayton, O.

Vulcalock—Fittings, pipe, tanks, valves. Goodrich Co., B. F., Akron, O.

Vulcan—Stands, tongs, vises. Williams & Co., J. H., Buffalo, N. Y.

Vulcan — Unions. Rockwood Sprinkler Co., Worcester, Mass.

Vulco — Belts, drives, pulleys. Gates Rubber Co., Denver, Colo.

WJ—Boiler cleaning compound. Radiator Specialty Co., Charlotte, N. C.

W. & McD.—Strainers, valves. Watson & McDaniel Co., Philadelphia, Pa.

W-S—Fittings. Watson-Stillman Co., Roselle, N. J.

W & T—Anemometers, feeders. Wallace & Tiernan Co., Inc., Belleville, N. J.

W-W—Pipe hangers. Western Wire Products Co., St. Louis, Mo.

Waico-Parmelee—Wrenches. Walworth Co., New York, N. Y.

Walltube — Radiator brackets. United Appliance Co., Rochester, N. Y.

Wallvane—Fans. Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.

Walseal Silbraz—Fittings, valves. Walworth Co., New York, N. Y.

Warco—Refractories. Walsh Refractories Corp., St. Louis, Mo.

Warco—Valves. Bridgeport Brass Co., Bridgeport, Conn.

Wat-a-mat—Water meters. Pfening Co., Fred D., Columbus, O.

Watco — Cooling towers, humidifiers, spray nozzles, spraying systems. Water Cooling Corp., New York, N. Y.

Water-Boy — Feeders. Maid-O'-Mist, Inc., Chicago, Ill.

Waterfilm—Heating boilers. Koven & Bro., Inc., L. O., Jersey City, N. J.

Water-Ray-Trola — Heaters. Ray Oil Burner Co., San Francisco, Calif.

Wenco—Preheaters, thermostats. Warren Electric Appliance Co., Warren, Pa.

Wear-Proof — Pumps. Schneible Co., Claude B., Detroit, Mich.

Wearweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Weathermaker—Unit air conditioners. Carrier Corp., Syracuse, N. Y.

Weathermaster—Unit air conditioners Carrier Corp., Syracuse, N. Y.

Weathermatic—Hot water heating systems. Lawler Automatic Controls, Mount Vernon, N. Y.

Weatherstat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Weatherwood — Insulation. United States Gypsum Co., Chicago, Ill.

Webster-Nesbitt—Unit heaters. Webster & Co., Camden, N. J.

Webster-Nesbitt "Little Giant" — Unit heaters. Nesbitt, Inc., John J., Philadelphia, Pa.

Weco—Gas burners. Webster Engineering Co., Tulsa, Okla.

Wedgbelt—V belts and v-belt drives, pulleys. American Pulley Co., Philadelphia, Pa.

Weir—Furnaces, stokers. Meyer Furnace Co., The, Peoria, Ill.

Weirnlead—Lead alloy coated sheets. Weirton Steel Co., Weirton, W. Va.

Weirzin — Electrolytic zinc coated sheets. Weirton Steel Co., Weirton, W. Va.

Weldells — Welding fittings. Taylor Forge & Pipe Works, Chicago, Ill.

Weldolets—Fittings. Bonney Forge & Tool Works, Allentown, Pa.

Weldomatic — Arc welders. Westinghouse Electric Corp., East Pittsburgh, Pa.

Weld-On—Heating and cooling surface. Extended Surface Div. of David E. Kennedy, Inc., Brooklyn, N. Y.

Weldotrol — Spot welders. Westinghouse Electric Corp., East Pittsburgh, Pa.

Weld-O-Tron—Arc welders. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Wesco — Fans. Northwest Foundry & Furnace Co., Portland, Ore.

Wesco — Solenoids. West Coast Electrical Mfg. Co., Los Angeles, Calif.

Wesco Giant — Furnaces. Northwest Foundry & Furnace Co., Portland, Ore.

Westernaire—Fans. Western Engineering & Mfg. Co., Los Angeles, Calif.

Westo — Water treatment. Western Chemical Co., Kansas City, Mo.

Westherm VisOdry — Dehydrators. Western Thermal Equipment Co., Los Angeles, Calif.

Whirlcone — Spray nozzles. Water Cooling Equipment Corp., St. Louis, Mo.

Whirljet—Spray nozzles. Spraying Systems Co., Chicago, Ill.

White Star—Valves. Powell Co., Wm., Cincinnati, O.

Whitson—Steam traps. Healy Ruff Co., St. Paul, Minn.

Whiz — Drills. Paramount Products Co., New York, N. Y.

Wilco—Bi-metals. Wilson Co., H. A., The, Newark, N. J.

Wilco—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.

Williams-Hager — Valves. Williams Gauge Co., Pittsburgh, Pa.

Wilson — Arc welders. Air Reduction Sales Co., New York, N. Y.

Wind-O-Vane—Propeller fans. Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Hyde Park, Boston, Mass.

Wind-O-Vent—Window ventilator and filter units. Reed Unit-Fans, Inc., New Orleans, La.

Wingfoil — Fans, ventilators. Wing Mfg. Co., L. J., New York, N. Y.

Winkler—Stokers. U. S. Machine Corp., Lebanon, Ind.

Winter-Chaser—Air conditioning units, furnaces, heaters. Campbell Heating Co., Des Moines, Ia.

Witch — Bolts, hangers, protectors. Carpenter & Paterson, Inc., East Boston, Mass.

Wolverine—Fans, ventilators. Belanger Fan & Blower Co., Detroit, Mich.

X-L — Gaskets, packing. Excelsior Leather Washer Co., Rockford, Ill.

Xacto — Meters. Bowser, Inc., Fort Wayne, Ind.

"X" Boilerliquid—Compounds. X Laboratories, Inc., New York, N. Y.

"X" Flush-Rustoff — Boiler cleaning compounds. X Laboratories, Inc., New York, N. Y.

"X" Pipejoin—Cement and compounds. X Laboratories, Inc., New York, N. Y.

Xit—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.

Yager's—Solder. Benson Co., Inc., Alex R., Hudson, N. Y.

Yarway — Alarms, clamps, expansion joints, nozzles, strainers, traps valves. Yarnall-Waring Co., Philadelphia, Pa.

Yellow-Jacket—Heating boilers. Burnham Boiler Corp., Irvington, N. Y.

Yoloy—Pipe, sheet, tubing. Youngstown Sheet & Tube Co., Youngstown, O.

Yorkaire—Unit air coolers. York Corp., York, Pa.

Zeph Air — Heaters. XXth Century Heating and Ventilating Co., Arkon, O.

Zig Zag—Heat exchangers. Stout & Sons, David, St. Louis, Mo.

Zim—Air filters. Chicago Filter Co., Joliet, Ill.

Zincgrip — Sheets. American Rolling Mill Co., Middletown, O.

Zonolite—Insulation. Munn & Steele, Inc., Newark, N. J.

Zonolite—Insulation. Robinson Insulation Co., Great Falls, Mont.

Zonolite—Insulation. Universal Zonolite Insulation Co., Chicago, Ill.

DIRECTORY SECTION

HEATING, PIPING AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 3—MANUFACTURERS' ADDRESSES

A & J Co., 844-848 W. 59th St., Chicago 21, Ill.
A-J Mfg. Co., 2119 Washington St., Kansas City, Mo.
Acadia Synthetic Products Div., Western Felt Works, 4115 Ogden Ave., Chicago, Ill.
Accurate Mfg. Works, 2336-38 Milwaukee Ave., Chicago 47, Ill.
Accurate Metal Weatherstrip, Inc., 216 E. 26th St., New York 10, N. Y.
Acer & Whedon, Inc., Medina, N. Y.
Acheson Mfg. Co., Braddock P. O., Rankin, Pa.
Acker Organization, Inc., W. M., 3167 Fulton Rd., Cleveland, O.
Ackermann Mfg. Co., Wheeling, W. Va.
Acme Asbestos Covering & Flooring Co., 236 N. Elizabeth St., Chicago 7, Ill.
Acme Electric Welder Co., 2618 Fruitland Rd., Los Angeles 11, Calif.
• Acme Industries, Inc., Cor. Mechanic and Ganson Sts., Jackson, Mich.
Acme Refining Co., The, W. 56th & W. & L. E. Ry. Cleveland, O.
Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.
Acme Tin Plate & Roofing Supply Co., 3rd and Westmoreland Sts., Philadelphia, Pa.
Acme White Lead & Color Works, 8250 St. Aubin Ave., Detroit 11, Mich.
Acorn Refining Co., 8001 Franklin Ave., Cleveland, O.
Acro Electric Co., 1392 Superior Ave., Cleveland 14, O.
Activator Process Sales Co., 501 S. Marengo Ave., Alhambra, Calif.
Adam Electric Co., Frank, 3650 Windsor St., St. Louis, Mo.
Adams Co., The, E. 4th St., P. O. Box 268, Dubuque, Ia.
Adams Co., Inc., R. P., 55 Chicago St., Buffalo, N. Y.
Advance Aluminum Castings Corp., 2742 W. 36th Pl., Chicago 32, Ill.
Advance Electric & Relay Co., 1260 W. Second St., Los Angeles 26, Calif.
Advance Fan & Blower Co., 3428 Bagley, Detroit, Mich.
Advance Insulating Co., Magee Bldg., Pittsburgh, Pa.
Aeolus Dickinson, 3320 S. Artesian Ave., Chicago 8, Ill.
Aerofin Corp., 410 S. Geddes St., Syracuse, N. Y.
Aeroil Products Co., Park Ave. at 57th St., West New York, N. J.
Aeroquip Corp., East St., Jackson, Mich.
Aerotec Co., White Plains, N. Y.
Aerovent Fan Co., 710 E. Ash St., Piqua, O.
• Agaloy Tubing Co., Springfield, O.
Aget-Detroit Co., 613 First National Bank Bldg., Ann Arbor, Mich.
Agnew Electric Co., Milford, Mich.
Agnew & Tomlinson, 101 Park Ave., New York 17, N. Y.
Ahlberg Bearing Co., 3081 W. 47th St., Chicago 32, Ill.
Air Conditioning Products Co., 1230-18th St., Detroit, Mich.
Air Control Products, Inc., Coopersville, Mich.
Air Controls, Inc., 2311 Superior Ave., Cleveland 14, O.
• Air Devices, Inc., 17 E. 42nd St., New York 17, N. Y.
Air Filter Corp., 2514 W. Lisbon Ave., Milwaukee 5, Wis.
Air Filter Engineering Co., 2450 S. Prairie Ave., Chicago 16, Ill.
Aire-Foile Fan & Blower Co., 4737 W. Vernor Highway, Detroit, Mich.
• Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y.
• Air & Refrigeration Corp., 475 Fifth Ave., New York, N. Y.
Airecon Industries, 2536 14th Ave., Detroit 16, Mich.
Airgard Mfg. Co., 362 W. Erie St., Chicago 10, Ill.
Airmaster Corp., 4317 Ravenswood Ave., Chicago 13, Ill.
• Air-Maze Corp., 5200 Harvard Ave., Cleveland 5, O.
AirO-Fin Register Co., 21700 Wyoming, Detroit 20, Mich.
Air-O-Cel Industries, Inc., 11616 Cloverdale Ave., Detroit, Mich.
Air-Stream Filter Corp., 2100 Washington Ave., St. Louis 3, Mo.
• Airtemp, Div. of Chrysler Corp., 1119 Leo St., Dayton 1, O.
• Airtherm Mfg. Co., 711 S. Spring Ave., St. Louis 10, Mo.
Airwasher Corp., 1122 N. Washington Ave., Lansing, Mich.
Ajax Flexible Coupling Co., Westfield, N. Y.
Akron Metallic Gasket Co., 155 N. Union, P. O. Box 911, Akron 9, O.
Akwa Heaters, Inc., 1955 Park Ave., New York 35, N. Y.
Alabama Pipe Co., Anniston, Ala.
Aladdin Heating Corp., 2222 San Pablo Ave., Oakland 12, Calif.
Albertson & Co., Inc., Sioux City, Ia.
Albright Equipment Co., 100 Station St., Johnstown, Pa.
• Alco Valve Co., 865 Kingsland Ave., St. Louis 5, Mo.
Aldrich Co., The, Wyoming, Ill.
Aldrich Pump Co., 4 Pine St., Allentown, Pa.
Alexander Bros., 406 N. 3rd, Philadelphia, Pa.
Alfol Insulation Co., Inc., 155 E. 44th St., New York 17, N. Y.
All Metal Weatherstrip Co., 2241 N. Knox Ave., Chicago 39, Ill.
Allegheny Ludlum Steel Corp., Brackenridge Pa.
Allen Billmyre Co., 431 Fayette Ave., Mamaroneck, N. Y.
Allen-Bradley Co., 1335 S. First St., Milwaukee, Wis.
Allen Corp., 9767 Erwin Ave., Detroit 13, Mich.
Allen Stoker Co., 235 S. Penn St., Allentown, Pa.
• Alliance Mfg. Co., Alliance, O.
Allied Weld-Craft, Inc., 401 W. South St., Indianapolis 4, Ind.
Allington & Curtis Mfg. Co., 1500 Holland Ave., Saginaw, Mich.
• Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Allis Co., Louis, The, 427 E. Stewart St., Milwaukee 7, Wis.
Allison Tool & Engineering Co., 4031 Whittier Blvd., Los Angeles 23, Calif.
Alloy Steel Products Co., 1506 W. Elizabeth Ave., Linden, N. J.
Allpax Co., Inc., Mamaroneck, N. Y.
All-Vac Steam Control System, 203 N. Wabash Ave., Chicago 1, Ill.; General Sales Office, 3145 N. Mascher St., Philadelphia 33, Pa.
Alpha Metals, Inc., 363 Hudson Ave., Brooklyn 1, N. Y.
Alphil Spot Welding Co., 431 W. Broadway, New York 12, N. Y.
Alrose Chemical Co., Providence, R. I.
Alten's Foundry & Machine Works, 226 W. Wheeling St., Lancaster, O.
Alton Mfg. Co., 1111 Camp St., Dallas 2, Tex.
Alton Mineral Wool Insulation Co., P. O. Box 24, Alton, Ill.
Aluminum Co. of America, 801 Gulf Bldg., Pittsburgh, Pa.
Amercoat Div., American Pipe & Construction Co., P. O. Box 3428, Terminal Annex, Los Angeles 54, Calif.
American Agile Corp., 5806 Hough Ave., Cleveland 3, O.
American Air Conditioning Co., Boulevard Bldg., Detroit, Mich.
• American Air Filter Co., Inc., 107 Central Ave., Louisville 8, Ky.
American Automatic Typewriter Co., 614 N. Carpenter St., Chicago, Ill.
American Blower Corp., Detroit 32, Mich.
• American Brass Co., 414 Meadow St., Waterbury 88, Conn.
American Car & Foundry Co., 30 Church St., New York, 8, N. Y.
American Cast Iron Pipe Co., 2930 N. 16th St., Birmingham 2, Ala.
American Coal Burner Co., 12-20 E. Erie St., Chicago 11, Ill.
American Coils, Inc., 25-27 Lexington St., Newark 5, N. J.
American Coolair Corp., 3604 Mayflower St., P. O. Box 2300, Jacksonville 3, Fla.
American Cooling Tower Co., 2710 McGee St., Kansas City 8, Mo.
• American District Steam Co., 25 Bryant St., North Tonawanda, N. Y.
American District Telegraph Co., 155 Sixth Ave., New York, N. Y.
American Engineering Co., Aramingo Ave. and Cumberland St., Philadelphia 25, Pa.
American Flange & Mfg. Co., Inc., 1901 R. C. A. Bldg., New York 20, N. Y.
American Flexible Coupling Co., 1801 Pittsburgh Ave., Erie, Pa.
American Foundry Equipment Co., 619 S. Byrkit St., Mishawaka, Ind.
American Foundry & Furnace Co., Washington St. at McClun, Bloomington, Ill.
American Furnace Co., 2719-31 Delmar Blvd., St. Louis 3, Mo.
• American Gas Accumulator Co., 1027 Newark Ave., Elizabeth 3, N. J.
American Hair & Felt Co., 1828 Merchandise Mart, Chicago 54, Ill.
American Hammered Piston Ring Div., Koppers Co., Bush and Hamburg Sts., Baltimore, Md.
American Hard Rubber Co., 11 Mercer St., New York 13, N. Y.
American Injector Co., 1481-14th St., Detroit 16, Mich.
American Instrument Co., Silver Spring, Md.
American K. A. T. Corp., 331 Madison Ave., New York 17, N. Y.
American-Larson Ventilating Co., 1004 Keystone Bank Bldg., Pittsburgh 22, Pa.
American Locomotive Co., Alco Products Div., 30 Church St., New York 8, N. Y.
American Locomotive Co., Diesel Engine Div., Auburn, N. Y.
American Machine Products Co., 401 S. Third Ave., Marshalltown, Ia.
American Manganese Bronze Co., Rhawn & Hegerman Sts. Philadelphia, Pa.
American-Marietta Co., 43 E. Ohio St., Chicago 11, Ill.
American-Marsh Pumps, Inc., 60 Capital Ave., N. E. Battle Creek, Mich.
American Metal Hose Branch, American Brass Co., 67 Jewelry St., Waterbury 88, Conn.
American Metal Products Co., 730 Hudgins St., Box 66 Sylvania Sta., Fort Worth 9, Tex.
American Metal Weather Strip Co., 144 N. Division Ave., Grand Rapids 2, Mich.
American Meter Co., Inc., 60 E. 42nd St., New York 17, N. Y.

• Advertisement in this issue. See Index to Advertisers, pages 367-368

American Moistening Co., 260 W. Exchange St., Providence, R. I.
American Molded Products Co., 1644 N. Honore St., Chicago 22, Ill.
American Nickeloid Co., 113 Second St., Peru, Ill.
• American Photocopy Equipment Co., 2849 N. Clark St., Chicago 14, Ill.
• American Pipe Bending Machine Co., Inc., 17 Furnace St., Boston, Mass.
American Pipe Tool Co., 4856 W. Kinzie St., Chicago 44, Ill.
American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
American Radiator & Standard Sanitary Corp., Bessemer Bldg., Pittsburgh 22, Pa.
• American Rolling Mill Co., The, 461 Curtis St., Middletown, O.
American Schaefer & Budenberg Instrument Div., Manning, Maxwell & Moore, Inc., 11 Elias St., Bridgeport 2, Conn.
American Sheet Metal Works, 331 N. Alexander, New Orleans, La.
American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.
American Solder & Flux Co., 2152 E. Norris St., Philadelphia 25, Pa.
American Steel Band Co., Box 565, Pittsburgh 30, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
American Sterilizer Co., Erie, Pa.
American Teksag Products Co., Inc., 395 N. MacQuesten Pkwy., Mt. Vernon, N. Y.
American Thermometer Co., 2907 Clark Ave., St. Louis, Mo.
American Ventilating Hose Co., 15 Park Row, New York 7, N. Y.
American Warming & Ventilating Co., 1017-1021 Summit St., Toledo 4, O.
American Water Softener Co., Lehigh Ave. and 4th St., Philadelphia 33, Pa.
American Welding & Mfg. Co., Griswald St., N. E., Warren, O.
American Well Wks., 100 N. Broadway, Aurora, Ill.
American Zinc Products Co., Greencastle, Ind.
Ames Co., W. R., 150 Hooper St., San Francisco 7, Calif.
• Ames Hydrovac, Inc., 290 Scholes St., Brooklyn 6, N. Y.
Ames Iron Works, Division of Pierce Butler Radiator Corp., Oswego, N. Y.
Amirton Co., Inc., 149 Broadway, New York 6, N. Y.
Ampex Electric Mfg. Co., 1414 El Camino Real, San Carlos, Calif.
Anchor Packing Co., 401 N. Broad St., Philadelphia 8, Pa.
Anchor Post Fence Co., Fluid Heat Div., 6500 Eastern Ave., Baltimore 24, Md.
Anchor Stove & Range Co., Third & Culbertson Sts., New Albany, Ind.
Andale Co., 1740 Cherry St., Philadelphia 3, Pa.
Andersen Corp., Bayport, Minn.
• Anderson Co., V. D., The, 1949 W. 96th St., Cleveland 2, O.
Anderson Engine & Foundry Co., Anderson, Ind.
Anderson Products, Inc., 17 Tudor St., Cambridge 39, Mass.
• Anderson-Stolz Corp., 1731 Walnut St., Kansas City, Mo.
• Anemostat Corp. of America, 10 E. 39th St., New York 16, N. Y.
Anetsberger Bros., 3505 Elston Ave., Chicago, Ill.
Ansul Chemical Co., Marinette, Wis.
• Apex All Weather Products, Engineering Div., 228 N. La Salle St., Chicago 1, Ill.
• Apex Engineering Co., 205 W. Wacker Dr., Chicago 6, Ill.
Apollo Steel Co., 609 Warren Ave., Apollo, Pa.
April Showers Co., 4126 Eighth St., N.W., Washington 11, D. C.
Aqua-Mist Co., 426 Jefferson St., Topeka, Kans.
Aqua-Restor Div., Mayer Mfg. Corp., 50 Division Pl., Brooklyn, N. Y.
Aqua-Sorb Co., 21 S. 16th St., East Orange, N. J.
Aquatic Chemical Laboratories, Inc., 95 Liberty St., New York 6, N. Y.
Arco Co., 7301 Bessemer Ave., Cleveland 4, O.
Arcos Corp., 1515 Locust St., Philadelphia 2, Pa.
Arcweld Mfg. Co., Inc., 3469 Third Ave., W., Seattle 99, Wash.
Arens Controls, Inc., 2267 S. Halsted St., Chicago, Ill.
Arex Co., 333 N. Michigan Ave., Chicago, Ill.
Armour Ammonia Works, 1355 W. 31st St., Chicago, Ill.
Armstrong-Blum Mfg. Co., 5700 Bloomingdale Rd., Chicago, Ill.
Armstrong Bros. Tool Co., 317-357 N. Francisco Ave., Chicago, Ill.
Armstrong Co., The, Post Ave. and South St., Detroit 17, Mich.
Armstrong Cork Co., 4400 Concord St., Lancaster, Pa.
Armstrong Heat Control Co., 523 S. E. 39th St., Portland 15, Ore.
• Armstrong Machine Wks., 874 Maple St., Three Rivers, Mich.
Armstrong Mfg. Co., 303 Knowlton St., Bridgeport 8, Conn.
Arrow-Hart & Hegeman Elect. Co., 103 Hawthorn St., Hartford, Conn.
Arrowhead Rubber Co., 2244 E. 37th St., Los Angeles 11, Calif.
Art Valve Co., 4662 N. Lincoln Ave., Chicago 25, Ill.
Ashcroft Gauge Div., Manning, Maxwell & Moore, Inc., Bridgeport 2, Conn.
Ashton Valve Co., 161-1st St., Cambridge 42, Mass.
Askania Regulator Co., 1603 S. Michigan Ave., Chicago 16, Ill.
Atkins & Co., E. C., 402 S. Illinois St., Indianapolis 9, Ind.
Atlantic Metal Hose Co., Inc., 123 W. 64th St., New York, N. Y.
Atlantic Steel Boiler Co., 21st St. and Washington Ave., Philadelphia 46, Pa.
Atlantic Steel Co., P. O. Box 1714, Atlanta 1, Ga.
Atlas Chemical Co., Marietta, O.
Atlas Electric Devices Co., 361 W. Superior St., Chicago, Ill.
Atlas Valve Co., Inc., 282 South St., Newark, N. J.
Atlas Welding Accessories Co., 14820 Wyoming Ave., Detroit 21, Mich.
Auburn Burner Co., Lock Box 269, Auburn, Ind.
Auburn Foundry Inc., Stoker Div., Auburn, Ind.
Auditorium Conditioning Corp., 17 E. 42nd St., New York, N. Y.
• Auer Register Co., 3608 Payne Ave., Cleveland 14, O.
Aurora Pump Co., 619 Loucks St., Aurora, Ill.
Austin-Mason Co., 15 Park Row, New York, N. Y.
• Autempco Corp., 521 Fifth Ave., New York 17, N. Y.
Autoforce Ventilating System, 244 Washington St., Boston 8, Mass.
• Automatic Control Co., 1011 University Ave., St. Paul 4, Minn.
Automatic Gas Equipment Co., 301 Brushton Ave., Pittsburgh 21, Pa.
• Automatic Products Co., 2460 N. 32nd St., Milwaukee 10, Wis.
Automatic Pump & Softener Corp., 1907 Kishwaukee St., Rockford, Ill.
Automatic Switch Co., 41 E. 11th St., New York 3, N. Y.
Automatic Temperature Control Co., Inc., 44 E. Logan St., Philadelphia 44, Pa.
Automotive Maintenance Machinery Co., North Chicago, Ill.
Azor Corp., 107 Montgomery Ave., Irvington, N. J.

B/W Controller Corp., 2200 E. Maple Ave., Birmingham, Mich.
Babbitt Industrial Specialties Co., 630 Fifth Ave., New York 20, N. Y.
Babcock & Wilcox Co., 85 Liberty St., New York 6, N. Y.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Babcock & Wilcox Tube Co., The, Welded Tube Div., Alliance, O.
Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh 8, Pa.
Bache & Co., Semon, Greenwich & Morton Sts., New York 14, N. Y.
Badger Corp., 327 E. Brown St., Milwaukee 12, Wis.
• Badger & Sons Co., E. B., 75 Pitts St., Boston 14, Mass.
Badger Fire Extinguisher Co., 624 Somerville Ave., Somerville 43, Mass.
Baer Bros., 438 W. 37th St., New York 18, N. Y.
Bahnson Co., 1001 S. Marshall St., Winston-Salem, N. C.
Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, O.
• Baker Ice Machine Co., Inc., 1531 Evans St., Omaha 1, Neb.
• Baldor Electric Co., 4353 Duncan Ave., St. Louis 10, Mo.
Baldwin Belting, Inc., 85 Chambers St., New York 7, N. Y.
Baldwin De La Vergne Sales Corp., Paschall P. O., Philadelphia, Pa.
Baldwin-Hill Co., 531 Klagg Ave., Trenton 2, N. J.
Baldwin Locomotive Works, Southwark Div., Eddystone, Pa.
Ballantyne Co., 1707-11 Davenport St., Omaha 2, Neb.
Balloffet Dies and Nozzle Co., Inc., 6825 Adams St., Guttenberg, N. J.
Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
• Barber-Colman Co., 1228 Rock St., Rockford, Ill.
Barber Gas Burner Co., 3704 Superior Ave., Cleveland 14, O.
Barclay, Inc., Robert, 128 N. Peoria St., Chicago, Ill.
Barco Mfg. Co., Not Inc., 1801 Winnemac Ave., Chicago 40, Ill.
Bardeo Mfg. & Sales Co., 2450 E. 23rd St., Los Angeles, Calif.
Bargar Sheet Metal Co., 12401 Euclid St., Cleveland, O.
Barnes Manufacturing Co., Mansfield, O.
Barnes & Jones, Inc., 128 Brookside Ave., Jamaica Plain, Boston 30, Mass.
Barnes Tool Co., The, 152 Brewery St., New Haven 6, Conn.
Barrett Div., The, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Barrett, Haentjens & Co., Hazleton, Pa.
Barrett Machine Co., 912-916 Behan St., N. S., Pittsburgh 12, Pa.
Bartlett Mfg. Co., 3003 E. Grand Blvd., Detroit 2, Mich.
Bart Mfg. Co., 227 Main St., Belleville 9, N. J.
Barton Instrument Co., 2306 E. 38th St., Los Angeles 11, Calif.
Basic Refractories, Inc., 845 Hamma Bldg., Cleveland 15, O.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bath Co., Cyril, The, E. 70th and Machinery Ave., Cleveland 8, O.
Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.
Bayer Co., 4030 Chouteau Ave., St. Louis 10, Mo.
Bayley Blower Co., 1817 S. 66th St., Milwaukee 14, Wis.
Beach-Russ Co., 64A Church St., New York, N. Y.
Beacon-Morris Corp., 110-114 Brookline Ave., Boston 15, Mass.
Bear Mfg. Co., Industrial Div., Rock Island, Ill.
Bearings Co. of America, 501 Harrisburg Ave., Lancaster, Pa.
Beaton & Cadwell Mfg. Co., 185 Main St., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Beatty Machine & Mfg. Co., 934 150th St., Hammond, Ind.
Beaver Pipe Tools, Inc., 310 Dana Ave., Warren, O.
Beck Engineering Combustion Kompany, 2100 Cole St., St. Louis 6, Mo.
Beckett & Co., Thomas, 2118 Griffin St., Dallas 2, Tex.
Beckley Perforating Co., 301 North Ave., Garwood, N. J.
Belanger Fan & Blower Co., 1230 18th St., Detroit, Mich.
Belco Exhaust Fan Mfg. Co., 3830-32 Olive St., St. Louis 8, Mo.
Belfield Co., H., 435 N. Broad St., Philadelphia 23, Pa.
Belfield Co., H., 435 N. Broad St., Philadelphia, Pa.
Belknap Mfg. Co., 800 Union Ave., Bridgeport 1, Conn.
• Bell & Gossett Co., Morton Grove, Ill.
Belmont Packing & Rubber Co., The, Butler & Sepviva Sts., Philadelphia 37, Pa.
Belmont Smelting & Refining Wks., Inc., 349 Belmont Ave., Brooklyn 7, N. Y.
Bendix Aviation Corp., Philadelphia Div., Philadelphia, Pa.
Benjamin Air Rifle Co., 1527 S. 8th St., St. Louis 4, Mo.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Bennett Oil Co., 964 S. Saddle Creek Rd., Omaha 6, Neb.
Benson Co., Inc., Alex R., 1040 Bay Rd., So. Hudson, N. Y.
Berger Bros. Co., 229-237 Arch St., Philadelphia 6, Pa.

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Berger Mfg. Div., Republic Steel Corp., 1038 Belden Ave., Canton 5, O.
Bern's Specialty Mfg. Co., 2278 Elston Ave., Chicago, Ill.
Bernz Co., Otto, 280 Lyell Ave., Rochester 6, N. Y.
Bertsch & Co., Inc., Church St., Cambridge City, Ind.
Best Register Co., 2005 W. Oklahoma Ave., Milwaukee 7, Wis.
Bethlehem Foundry & Machine Co., W. Second St., Bethlehem, Pa.
• Bethlehem Steel Co., Bethlehem, Pa.
Betz Corp., 460 State St., Hammond, Ind.
Beverly Shear Mfg. Co., 3004 111th St., Chicago 43, Ill.
Bien Air Conditioning Co., 362 W. Garvey Ave., Monterey Park, Calif.
Biersach & Niedermeyer Co., 1937 N. Hubbard St., Milwaukee 12, Wis.
Bigelow Co., 174 River St., New Haven 13, Conn.
Biggs Boiler Wks. Co., The, Case Ave. and B. & O. R. R., E. Akron 5, O.
Bignall & Keeler Machine Wks., Edwardsville, Ill.
Billings & Spencer Co., 1 Laurel St., Hartford 6, Conn.
• Binks Mfg. Co., 3114-40 Carroll Ave., Chicago 12, Ill.
Birchfield Boiler, Inc., 2503 E. 11th St., Tacoma 1, Wash.
Bird-Archer Co., 4337 North American St., Philadelphia 40, Pa.
• Bird-White Co., 3119 W. Lake St., Chicago 12, Ill.
• Bishop & Babcock Mfg. Co., 4901 Hamilton Ave., Cleveland 14, O.
• Black & Decker Mfg. Co., Pennsylvania Ave., Towson 4, Md.
Black Magic Products Co., P. O. Box 1703, Tulsa, Okla.
Black Mfg. Co., The, 1426 W. Baltimore St., Baltimore 23, Md.
Black-Sivalls & Bryson, Inc., 7501 E. 10th St., Kansas City 3, Mo.
Blackburn-Smith Mfg. Co., River St., Hoboken, N. J.
Blackhawk Mfg. Co., 5325 W. Rogers St., Milwaukee 1, Wis.
Blackmer Pump Co., 1920A Century Ave., S. W., Grand Rapids 9, Mich.
Blaisdell Compressor Co., 227 Fulton St., New York, N. Y.
Bliss Co., E. W., 1420 Hastings St., Toledo, O.
Blocksom & Co., E. 5th St., Michigan City, Ind.
Blood Brothers Machine Co., Div. of Standard Steel Spring Co., Allegan, Mich.
Blower Application Co., 918 N. Fourth St., Milwaukee 3, Wis.
Blue Ridge Talc Co., Inc., Henry, Va.
Blue Seal Chemical Co., 177 Westfield Ave., W., Roselle Park, N. J.
Bodine Electric Co., 2254 W. Ohio St., Chicago 12, Ill.
Bogue Electric Co., 37 Kentucky Ave., Paterson 3, N. J.
Bohn Aluminum & Brass Corp., 2306 Franklin St., Detroit, Mich.
Boiler Room Equipment, Inc., 468 Fourth Ave., New York 16, N. Y.
Bonafide Genasco, Inc., 295 Fifth Ave., New York 16, N. Y.
• Bonney Forge & Tool Wks., 350 Green St., Allentown, Pa.
Bordo Co., Inc., L. J., 115 New St., Glenside, Pa.
Borg-Erickson Corp., 469 E. Ohio St., Chicago 11, Ill.
Borm Mfg. Co., Elgin, Ill.
Boston Auto Gage Co., 70 West St., Pittsfield, Mass.
Boston Gear Works, Inc., North Quincy, Mass.
Boston Woven Hose & Rubber Co., P. O. Box 1071, Boston 3, Mass.
Botfield Refractories Co., Swanson & Clymer Sts., Philadelphia 47, Pa.
Bowen Research Corp., Garwood, N. J.
Bowser, Inc., 1302 E. Creighton Ave., Fort Wayne 2, Ind.
Boylston Steam Specialty Co., 116-122 W. Illinois St., Chicago, Ill.
Brabender Corp., Rochelle Park, N. J.
Brasco Mfg. Co., Harvey, Ill.
Brauer Supply Co., A. G., 2100 Washington Ave., St. Louis 3, Mo.
Breidert Co., G. C., 634 S. Spring St., Los Angeles 14, Calif.
Bremil Mfg. Co., Box 1030, Erie, Pa.
Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn.
Bridgeport Thermostat Co., Inc., Connecticut Ave., Bridgeport 1, Conn.
Bristol Co., The, P.O. Box 1790, Waterbury 91, Conn.
Brooke Engineering Co., Inc., 4517 Wayne Ave., Philadelphia 44, Pa.
Brookfield Engineering Laboratories, Sharon, Mass.
Brooks Equipment Corp., 90 West Ave., New York 6, N. Y.
Bros Boiler & Mfg. Co., Wm., 1057 Tenth Ave., S. E., Minneapolis 14, Minn.
Brown-Brockmeyer Co., Inc., P. O. Box 976, Dayton 1, O.
Brown Fintube Co., The, Elyria, O.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., 4534 Wayne Ave., Philadelphia 44, Pa.
Brownell Co., 300 N. Findlay St., Dayton 1, O.
Browning Mfg. Co., Inc., 1940 Browning Blvd., Maysville, Ky.
Brundage Co., The, 500-514 N. Park St., Kalamazoo 11, Mich.
Bruning Co., Inc., Charles, 4754 Montrose Ave., Chicago 41, Ill.
Brunner Mfg. Co., 1821 E. Broad St., Utica 1, N. Y.
Bryan Steam Corp., P. O. Box 337, Peru, Ind.
Bryant Heater Co., The, 17825 St. Clair Ave., Cleveland 10, O.
Bubar, Hudson H., 15 Park Row, New York 7, N. Y.
Buckeye Tools Corp., 29 W. Apple St., Dayton 1, O.
Buckeye Products Co., 7024 Vine St., Cincinnati 16, O.
Buda Co., Harvey, Ill.
Buffalo Bolt Co., North Tonawanda, N. Y.
• Buffalo Forge Co., 171 Mortimer St., Buffalo 5, N. Y.
Buffalo Foundry & Machine Co., 43 Winchester Ave., Buffalo, N. Y.
Buffalo Meter Co., 2917 Main St., Buffalo 14, N. Y.
• Buffalo Pumps, Inc., 171 Mortimer St., Buffalo 5, N. Y.
Buffalo Tank Corp., Dunellen, N. J.; Buffalo, N. Y.
Buffalo Turbine Corp., 2165 Bailey Ave., Buffalo 11, N. Y.
Builders-Providence, Inc., Div. of Builders Iron Foundry, 9 Codding St., Providence 1, R. I.
Bullard Co., The, 286 Canfield Ave., Bridgeport 2, Conn.
Bundy Steam Trap Co., Nashua, N. H.
Bundy Tubing Co., 10951 Hern Ave., Detroit 13, Mich.
Bump Pump Co., La Crosse, Wis.
• Burden Fan & Blower Co., 8619 W. Third St., Los Angeles 36, Calif.
Burgess-Norton Mfg. Co., 773 Peyton St., Geneva, Ill.
Burhorn Co., Edwin, 554 W. 48th St., New York 19, N. Y.
Burke Electric Co., 1201 W. 12th St., Erie, Pa.
Burke Stoker & Mfg. Co., 921 W. 19th St., Chicago, Ill.
Burling Instrument Co., Air Conditioning Div., 253 Springfield Ave., Newark 3, N. J.
• Burnham Boiler Corp., Main St., Irvington, N. Y.
Burnham Stoker Co., 505 Columbia St., Vancouver, Wash.
Burnley Battery & Mfg. Co., Clay St., North East, Pa.
Burrows Mfg. Co., F. A., 318 E. Poplar St., York, Pa.
Burt Mfg. Co., 635 Main St., Akron, O.
Bury Compressor Co., 18th & Cascade Sts., Erie, Pa.
• Bush Mfg. Co., 100 Wellington St., Hartford 6, Conn.
Byers Co., A. M., Clark Bldg., Pittsburgh 22, Pa.
Byron Jackson Co., P. O. Box 2017, Terminal Annex, Los Angeles 54, Calif.

C-B Tool Co., Wabank Rd., Lancaster, Pa.
C & H Air Conditioning Fan Co., Inc., Edgewood Ave. and Ivy St., N. E., Atlanta 3, Ga.
Cabot, Inc., Samuel, 141 Milk St., Boston 9, Mass.
Calbar Paint & Varnish Co., 2612-26 N. Martha St., Philadelphia 25, Pa.
Caldwell Co., W. E., 2120 Brook St., Louisville, Ky.
Caldwell Co., Wm. J., 1129 Vermont Ave., N. W., Washington 3, D. C.
Calgon, Inc., Hagan Bldg., Pittsburgh 30, Pa.
Callahan Can Machine Co., Inc., 80 Richard St., Brooklyn, N. Y.
California Brass Mfg. Co., 1447 Naud St., Los Angeles 12, Calif.
Calorider Corp., 1 Atlantic St., Stamford, Conn.
Caloroil Burner Corp., 1477 Park St., Hartford, Conn.
Campbell Heating Co., E. K., 2445 Charlotte St., Kansas City 8, Mo.
Campbell Heating Co., 31st & Dean, P. O. Box 833, Des Moines 4, Ia.
Canatsey Electric Mfg. Co., 2207 McGee St., Kansas City 8, Mo.
Cannon Chemical Co., 210 Broadway, Everett 49, Mass.
Canton Stoker Corp., 407 Andrew Place, S. W., Canton 1, O.
Canvas Products Co., 1236 S. 7th St., St. Louis 4, Mo.
Capitol Brass Works, Div. of Bohn Aluminum & Brass Corp., 2306 Franklin St., Detroit, Mich.
Carbide and Carbon Chemicals Corp., 30 E. 42nd St., New York 17, N. Y.
Carey Mfg. Co., Philip, Wayne Ave., Lockland, Cincinnati 15, O.
Cargocaire Engineering Corp., 75 West St., New York, N. Y.
Carlin Co., Anthony, 2717 E. 75th St., Cleveland, O.
Carling Turbine Blower Co., 25 St. John's Rd., Worcester 3, Mass.
Carnegie-Illinois Steel Corp., Carnegie Bldg., Pittsburgh 30, Pa.
Carnes, Inc. John R., Greenlawn Ave. & Erie R. R., Lima, O.
Carney Rockwool Co., Mankato, Minn.
• Carolina Aniline & Extract Co., Inc., 301 S. Cedar St., Charlotte 1, N. C.
Carpenter & Paterson, Inc., 1190 Bennington St., East Boston 28, Mass.
Carpenter Steel Co., The, Welded Alloy Tube Div., Kenilworth, N. J.
• Carrier Corp., 302 S. Geddes St., Syracuse 1, N. Y.
Carter Paint Co., 310 N. Main St., Liberty, Ind.
Carter Products Corp., 6921 Carnegie Ave., Cleveland 3, O.
Carty & Moore Engineering Co., 511 W. Larned St., Detroit 26, Mich.
Case & Son Mfg. Co., W. A., 33 Main St., Buffalo 3, N. Y.
• Cash Co., A. W., P. O. Box 135, Decatur, Ill.
Cash Valve Mfg. Co., A. W., 666 E. Wabash Ave., Decatur 80, Ill.
Cashin Co., W. D., 69 A St., Boston 27, Mass.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Caterpillar Tractor Co., 600 W. Washington St., Peoria, Ill.
Catskill Metal Works, Inc., Catskill, N. Y.
Celotex Corp., The, 120 S. La Salle Bldg., Chicago 3, Ill.
Cement Lined Pipe Co., 93 Brookline St., Lynn, Mass.
Central Brass Mfg. Co., 2950 E. 55th St., Cleveland 41, O.
Central Die Casting & Mfg. Co., Inc., 2935 W. 47th St., Chicago, Ill.
Central Foundry Co., 386 Fourth Ave., New York 16, N. Y.
Central Rubber & Steel Corp., 433 W. Main Cross St., Findlay, O.
Central Station Steam Co., 2920 E. Woodbridge St., Detroit 7, Mich.
Central Wire & Iron Works, 621 E. Locust St., Des Moines, Ia.
Centrifix Corp., 3029 Prospect Ave., Cleveland 15, O.
Centri-Spray Co., 14290 Meyers Rd., Detroit 27, Mich.
Century Aircraft Co., 5601 W. Century Blvd., Inglewood, Calif.
Century Electric Co., 1806 Pine St., St. Louis, Mo.
Century Engineering Corp., 401-431 3rd St., S. E., Cedar Rapids, Ia.
Century Fan & Ventilator Co., 103 E. 125th St., New York, N. Y.
Certain-teed Products Corp., 100 E. 42nd St., New York, N. Y.
Certified Flexible Couplings, 369 Lexington Ave., New York 17, N. Y.
Certified Furnace Co., Div. of Stainless & Steel Products Co., 1000 Berry Ave., St. Paul 4, Minn.
Chace Co., W. M., 1606 Beard Ave., Detroit 9, Mich.
Chain Belt Co., 1617 W. Bruce, Milwaukee 4, Wis.
Chamberlin Co. of America, 1254 La Brosse St., Detroit 26, Mich.

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Champion Blower & Forge Co., Harrisburg Ave. and Charlotte St., Lancaster, Pa.
Champion Furnace Pipe Co., 215 Eaton St., Peoria 3, Ill.
Champion Machine & Forging Co., 3695 E. 78th St., Cleveland 5, O.
Champion Unit Heater Co., 4639-41 Washington Blvd., Chicago 44, Ill.
Chandler Co., 804 First Ave., N. W., Cedar Rapids, Ia.
Chaplin-Fulton Mfg. Co., 28-40 Penn Ave., Pittsburgh, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Char-Gale Mfg. Co., 3127 Hiawatha Ave., Minneapolis 6, Minn.
Chase Brass & Copper Co., 236 Grand St., Waterbury 91, Conn.
Chase-Shawmet Co., Newberyport, Mass.
Cheeseman-Elliot Co., Inc., Kent Ave., Brooklyn 11, N. Y.
• Chelsea Products, Inc., 1206 S. Grove St., Irvington 11, N. J.
Chelsea Metal Stamping Co., 95 8th Ave., New York 11, N. Y.
Cheney Metal Products Co., 623 Prospect St., Trenton 5, N. J.
Chesapeake & Ohio R.R. Co., Terminal Tower, Cleveland, O.
Chicago Belting Co., 113-125 N. Green St., Chicago 7, Ill.
Chicago Bridge & Iron Co., 332 S. Michigan Ave., Chicago 4, Ill.
Chicago Die Casting Mfg. Co., 2515 W. Monroe St., Chicago 12, Ill.
Chicago Expansion Bolt Co., 2240 W. Ogden Ave., Chicago 12, Ill.
Chicago Filter Co., Joliet, Ill.
Chicago Fire Brick Co., 1467 N. Elston Ave., Chicago, Ill.
Chicago Furnace Supply Co., 1278 Clybourn Ave., Chicago, Ill.
Chicago Metal Hose Corp., 1315 S. Third Ave., Maywood, Ill.
Chicago Metal Mfg. Co., 3724 S. Rockwell St., Chicago 32, Ill.
Chicago Nipple Mfg. Co., 1966 Southport Ave., Chicago 14, Ill.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
Chicago Pump Co., 2323 Wolfram St., Chicago 18, Ill.
Chicago Specialty Mfg. Co., 2954 Lawrence Ave., Chicago 25, Ill.
Chicago Steel Tank Co., 6400 W. 66th, Chicago 38, Ill.
Chicago Steel & Wire Co., 103rd St. and Torrence Ave., Chicago 17, Ill.
Chicago-Wilcox Mfg. Co., E. 77th St. and Anthony Ave., Chicago, Ill.
Chiksan Tool Co., Brea, Calif.
Chisholm Co., Allen E., 2640 E. Burnside St., Portland, Ore.
Cincinnati Electrical Tool Co., The, 2684 Madison Rd., Cincinnati 8, O.
Cincinnati Shaper Co., Hopple, Garrard and Elam, Cincinnati 25, O.
Cincinnati Sheet Metal & Roofing Co., The, 230 E. Front St., Cincinnati, O.
Circulators & Devices Mfg. Corp., 22 Rose St., New York, N. Y.
Cissell Mfg. Co., W. M., 331 S. First St., P. O. Box 1143, Louisville 1, Ky.
• Clarage Fan Co., Porter St., Kalamazoo 16, Mich.
Clark Bros. Bolt Co., Milldale, Conn.
Clark Controller Co., 1146 E. 152nd St., Cleveland 10, O.
Clark Cooper Co., Palmyra, N. J.
Clark Dust Control Co., 210 N. Mozart St., Chicago, Ill.
Clark Jr. Electric Co., Jas., 600 Bergman St., Louisville 3, Ky.
Clark Mfg. Co., 1830 E. 38th St., Cleveland 14, O.
Clauss Shear Co., Fremont, O.
Clay Equipment Corp., Cedar Falls, Ia.
• Clayton & Lambert Mfg. Co., 11111 French Rd., Detroit 5, Mich.
• Clayton & Lambert Mfg. Co., Middletown Div., Middletown, O.
Clayton Mfg. Co., Alhambra, Calif.
Cleaver-Brooks Co., 5100 N. 33rd St., Milwaukee 9, Wis.
Cleghorn Co., 86 Broad St., Boston, Mass.
Cleveland Humidifier Co., 7802 Wade Park Ave., Cleveland 3, O.
Cleveland Punch & Shear Works Co., E. 40th and St. Clair Ave., Cleveland 14, O.
Clifford Mfg. Co., 564 E. First St., Boston, Mass.
Clinton Metallic Paint Co., P. O. Box 278, Clinton, N. Y.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Clow & Sons, James B., 201-299 N. Talman Ave., Chicago 12, Ill.
Cochrane Corp., 3131 N. 17th St., Philadelphia 32, Pa.
Coddington Mfg. Co., E. D., 5024 N. 37th St., Milwaukee, Wis.
Coe Mfg. Co., Bank St., Painesville, O.
Cohoes Rolling Mill Co., Canvass and Cortland Sts., Cohoes, N. Y.
Cole-Sullivan Engineering Co., 1316 Third St., N., Minneapolis, Minn.
Colebrook & Sons, Inc., W. H., 246 Walton St., Syracuse, N. Y.
Colonial Alloys Co., Metals Div., Ridge Ave. and Crawford St., Philadelphia 19, Pa.
Columbia Radiator Co., 3400 Walnut St., McKeesport, Pa.
Columbia Steel Co. (Sub. United States Steel Corp.), Russ Bldg., 235 Montgomery St., San Francisco 6, Calif.
Columbian Steel Tank Co., 1509 W. 12th St., Kansas City 7, Mo.
Columbus Heating & Ventilating Co., 182 N. Yale Ave., Columbus 16, O.
Columbus Steam Pump Wks. Co., 724 W. Gay St., Columbus 8, O.
Combination Boiler Co., Benton Harbor, Mich.
Combustion Control Corp., 77 Broadway, Cambridge 42, Mass.
Combustion Engineering Co., Inc., 200 Madison Ave., New York 16, N. Y.
Comfort Products Corp., 2220 S. Lamesa, Dallas, Tex.
Commercial Filters Corp., 18 W. Third, Boston 27, Mass.
Commercial Plastics Co., 201 N. Wells St., Chicago 6, Ill.
• Commercial Shearing & Stamping Co., 1775 Logan, P. O. Box 719, Youngstown 1, O.
Commonwealth Brass Corp., 5781-5835 Commonwealth Ave., Detroit 8, Mich.
Commonwealth Electric Welder Mfg. Co., 3200-F W. Oxford St. Philadelphia, Pa.
Commonwealth Products Co., Real Estate Trust Bldg., Philadelphia 7, Pa.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Conditionaire Unit Co., 2821 Montrose Ave., Chicago 18, Ill.
Congress Die Casting Div., Congress Tool & Die Co., 3750 E. Outer Drive, Detroit 12, Mich.
Conklin Brass & Copper Co., Inc., T. E., 54-60 Lafayette St., New York, N. Y.
Conneaut Plastic Metallic Packing Co., Conneaut, O.
Connery Construction Co., 2nd and Luzerne Sts., Philadelphia 40, Pa.
• Connor Engineering Corp., W. B., 114 E. 32nd St., New York 16, N. Y.
Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Consolidated Safety Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport 2, Conn.
Continental Diamond Fibre Co., Newark, Del.
Continental Electric Co., Inc., 323 Ferry St., Newark, N. J.
Continental Motors Corp., Muskegon 82, Mich.
Continental Products Co., 1150 E. 222nd St., Euclid 17, O.
Continental Rubber Wks., 1902 Liberty Blvd., Erie, Pa.
Continental Steel Corp., 1108 S. Main St., Kokomo, Ind.
Controlair Mfg. Co., 1932 S. Compton Ave., Los Angeles, Calif.
Cook, Inc., A. D., Lawrenceburg, Ind.
• Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.
• Coolstream Corp., The, 240 Butler St., Brooklyn, N. Y.
Cooper Alloy Foundry Co., Hillside, N. J.
Cooper-Bessemer Corp., The, 200 Thomas Ave., Mt. Vernon, O.
Cooper & Cooper, 37 Fenn St., Pittsfield, Mass.
Cooper Co., Clark, Palmyra, N. J.
Copeland Refrigeration Corp., Sidney O.
Coppus Engineering Corp., 344 Park Ave., Worcester 2, Mass.
Corbman Bros., Inc., 315 N. 7th St., Philadelphia 6, Pa.
Cordo Chemical Co., 34 Smith St., Norwalk, Conn.
Cork Import Corp., 330 W. 42nd St., New York 18, N. Y.
Cork Insulation Co., Inc., 155 E. 44th St., New York, N. Y.
Corley Co., 629 Grove St., Jersey City 2, N. J.
Corning Glass Works, Corning, N. Y.
Coroaire Heater Corp., The, 1124 Hanna Bldg., Cleveland 15, O.
Cramer Co., Inc., R. W., The, Centerbrook, Conn.
• Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Crane Packing Co., 1872 Cuyler Ave., Chicago 13, Ill.
Crawford Co., 3220 W. 31st St., Chicago 23, Ill.
Crescent Tool Co., 230 Harrison St., Jamestown, N. Y.
Crise Elec. Mfg. Co., 2040 E. Main, Columbus, O.
Crocker-Wheeler Electric Mfg. Co., Div. Joshua Hendy Iron Works, Ampere 14, N. J.
Croll-Reynolds Engineering Co., Inc., 17 Johns St., New York 7, N. Y.
Croll & Son, Jesse G., 2326-2606 Germantown Ave., Philadelphia, Pa.
Crown Controls Co., New Breman, O.
Crown Die & Tool Co., 108 N. Jefferson St., Chicago 6, Ill.
• Crown Iron Works Co., 1202 N. E. Tyler, Minneapolis, Minn.
Crucible Steel Co. of America, 405 Lexington Ave., New York, N. Y.
Cryer Trap & Valve Co., Inc., 366 Madison Ave., New York 17, N. Y.
Cuno Engineering Corp., 80 S. Vine St., Meriden, Conn.
Curtis & Curtis Co., The, 450 Garden St., Bridgeport, Conn.
• Curtis Refrigerating Machine Div., Curtis Mfg. Co., 1950 Kienlen Ave., St. Louis 20, Mo.
Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee 1, Wis.
Cyclotherm Corp., 90 Broad St., New York, N. Y.
Cyrus Shank Co., 625 W. Jackson Blvd., Chicago 6, Ill.
Dahlquist Mfg. Co., Inc., 628 Somerville Ave., Somerville 43, Mass.
Dahlstrom Machine Works, 5014 N. Kedzie Ave., Chicago 25, Ill.
Dahlstrom Metallic Door Co., S. E. cor. E. Second and Buffalo Sts., Jamestown, N. Y.
Daigger & Co., A., 161 W. Kinzie St., Chicago, Ill.
Dallas Engineering Co., Inc., 200 S. Akard, Dallas, Tex.
Dalmo-Victor Co., San Carlos, Calif.
Dampney Co. of America, 1243 River St., Hyde Park, Boston 36, Mass.
Danzer Metal Works Co., Box 201, Hagerstown, Md.
Darcoid Co., Inc., 145 Sixth Ave., New York 13, N. Y.
Darling Valve & Mfg. Co., 701 First St., Williamsport, Pa.
Dart Mfg. Co., E. M., 134 Thurbers Ave., Providence 5, R. I.
Davey Compressor Co., Kent, O.
Davidson Co., M. T., 43-53 Keap St., Brooklyn 11, N. Y.
Davidson Hy Duty Roof Fan Co., 213 California St., Newton, Mass.
Davies & Co., Wayne, 326 Pleasant St., Worcester 2, Mass.
Davis & Co., Inc., Dean W., 1006 First St., Kentland, Ind.
Davis Engineering Corp., 1070 E. Grand St., Elizabeth 4, N. J.
Davis Regulator Co., 2546 S. Washtenaw Ave., Chicago 8, Ill.
Davison Chemical Corp., The, 20 Hopkins Pl., Baltimore 3, Md.
Day Co., The, 810-830 Third Ave., N. E., Minneapolis 13, Minn.
Dayton Air Compressor Co., Dayton, O.
Dayton-Dowd Co., 115-17 York St., Quincy, Ill.
Dayton Rubber Mfg. Co., 2345 W. Riverview Ave., Dayton 1, O.
• Dean Brothers Pumps, Inc., 323 W. 10th St., Indianapolis, Ind.
Dean Hill Pump Co., 4000 E. 16th St., Indianapolis 7, Ind.
Dearborn Chemical Co., 310 S. Michigan Ave., Chicago, Ill.
Debevoise Co., The, 968 Grand St., Brooklyn 6, N. Y.
• De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Decatur Iron & Steel Co., P. O. Box 72, Decatur, Ala.
• Decatur Pump Co., 41 Elk St., Decatur 70, Ill.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
Defender Instrument & Regulator Co., 308 S. 8th St., St. Louis 2, Mo.
De Laval Steam Turbine Co., 300 Nottingham Way, Trenton 2, N. J.

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Dzus Fastener Co., Inc., Babylon, N. Y.
• Eagan Co., Walter H., 2336-38 Fairmount Ave., Philadelphia 30, Pa.
Eaglé-Picher Lead Co., American Bldg., Cincinnati 1, O.
Eaglesfield Ventilator Co., 910-20 Dorman St., Indianapolis, Ind.
Eastern Air Devices, Inc., Sales and Engineering Offices, 130 Flatbush Ave., Brooklyn, N. Y.
Eastern Engineering Co., 45 Fox St., New Haven 6, Conn.
Eastern Foundry Co., Boyertown, Pa.
Eastern Foundry Co., Peerless Heater Div., Boyertown, Pa.
Eastern Oil & Equipment Co., 27 Portland St., Portland 3, Me.
Eastern Stainless Steel Corp., P. O. Box 1975, Baltimore 3, Md.
Eastman Kodak Co. Kodak Park, Rochester 4, N. Y.
Delco Appliance Div., General Motors Corp., P. O. Box 230, Rochester 1, N. Y.
Delco Products Div., General Motors Corp., 329 E. First St., Dayton 1, O.
Delta-Star Electric Co., 2400 Block, W. Fulton St., Chicago, Ill.
Deming Co., 14 Aetna St., Salem, O.
Demuth & Sons, Charles, 245 Elm Place, Mineola, L. I., N. Y.
Dersch, Gesswein & Neuert, Inc., 4849 W. Grand Ave., Chicago 39, Ill.
Desmond-Stephan Mfg. Co., Urbana, O.
Desolvo Co., The, 719 Foreland St., Pittsburgh 12, Pa.
Despatch Oven Co., 619 S. E. Eighth St., Minneapolis 14, Minn.
Detroit Air Conditioning Service Co., Inc., 1314 Holden Ave., Detroit 2, Mich.
Detroit Brass & Malleable Works, 100 S. Campbell, Detroit 9, Mich.
Detroit Graphite Co., 550 12th St., Detroit, Mich.
• Detroit Lubricator Co., 5900 Trumbull Ave., Detroit 8, Mich.
Detroit Seamless Steel Tubes Co., c/o Grand River Station, Detroit 8, Mich.
• Detroit Stamping Co., 337 Midland Ave., Detroit 3, Mich.
Detroit Steel Products Co., 2250 E. Grand Blvd., Detroit, Mich.
Detroit Stoker Co., Fifth Floor, General Motors Bldg., Detroit 2, Mich.
DeVilbiss Co., The, 300 Phillips Ave., Toledo 1, O.
DeVine Mfg. Co., Inc., J. P., 909 Shawnee Ave., Mt. Vernon, Ill.
Devoe & Raynolds Co., Inc., 44th St. and 1st Ave., New York 17, N. Y.
Dial Light Co. of America, Inc., 92 West St., New York, N. Y.
Diamond Chain & Mfg. Co., 438 Kentucky Ave., Indianapolis 7, Ind.
Diamond Chemical Products, 17 E. 48th St., New York, N. Y.
Diamond Expansion Bolt Co., Inc., 500 North Ave., Garwood, N. J.
Diamond Mfg. Co., 253 W. Eighth St., Wyoming, Pa.
Diamond Power Specialty Corp., P. O. Box 288, Detroit 31, Mich.
Diceler Corp., The, Blair St. and Spring Garden Ave., Berwick, Pa.
Dick Co., Inc., R. & J., 24-48 Sade St., Passaic, N. J.
Dickinson, Aeolus, 3320 S. Artesian Ave., Chicago 8, Ill.
Diehl Mfg. Co., Finderne Plant, 1106 Finderne Ave., Somerville, N. J.
Dietzgen Co., Eugene, 2425 Sheffield Ave., Chicago 14, Ill.
Dillon Co., 220-C E. Brady St., Tulsa, Okla.
Dillon Steam Boiler Wks., Inc., D. M., Crocker St., Fitchburg, Mass.
Dillon Co., Inc., W. C., 5410 W. Harrison St., Chicago 44, Ill.
Dixon Crucible Co., Joseph, Wayne & Monmouth Sts., Jersey City, N. J.
Doall Co., The, 254 N. Laurel Ave., Des Plaines, Ill.
Dockson Corp., 3839 Wabash Ave., Detroit 8, Mich.
Dockstader, Inc., S. E., 1128 Munsey Bldg., Washington 4, D. C.
Dodge Mfg. Corp., 500 S. Union St., Mishawaka, Ind.
Doheny Co., John J., 326 Lake St., Belmont, Mass.
• Dole Valve Co., The, 1933 Carroll Ave., Chicago 12, Ill.
• Dollinger Corp, 9 Centre Park, Rochester 3, N. Y.
Domestic Engine & Pump Co., Shippensburg, Pa.
• Douglas Automatic Controls Co., 4505 Firestone Blvd., South Gate, Calif.
Dow Chemical Co., The, Midland, Mich.
• Dowell, Inc., 529 Kennedy Bldg., Tulsa 3, Okla.
Downingtown Iron Wks., Wallace Ave., Downingtown, Pa.
Downs-Smith Brass & Copper Co., 304-320 E. 45th St., New York, N. Y.
Dracco Corp., 4057 E. 116th St., Cleveland 5, O.
Dragert Co., Inc., C. H., 237 India St., Brooklyn, N. Y.
• Dravo Corp., Machinery Div., 300 Penn Ave., Pittsburgh 2, Pa.
Drayer & Hanson, Inc., 738 E. Pico Blvd., Los Angeles 21, Calif.
Dreis & Krump Mfg. Co., 7404 Loomis Blvd., Chicago 36, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., 490 Fisher Ave., Bradford, Pa.
Drinkwater, Inc., 2323 S. Michigan Ave., Chicago 16, Ill.
Dri-Steam Products, Inc., 29 Broadway, New York 6, N. Y.
Drying Systems, Inc., 1800 W. Foster Ave., Chicago 40, Ill.
Dry-Zero Corp., Merchandise Mart, Chicago 54, Ill.
Dual Air Fan Co., 711 W. Lake St., Chicago 6, Ill.
Dudgeon, Inc., Richard, Columbia and Broome Sts., New York 2, N. Y.
• Dunham Co., C. A., 450 E. Ohio St., Chicago 11, Ill.
Dunn, Inc., Struthers, 1321 Arch St., Philadelphia 7, Pa.
du Pont de Nemours & Co., E. I., Ammonia Dept., Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Electrochemicals Dept., Wilmington 98, Del.
du Pont de Nemours & Co., Inc., E. I., Fabrics & Finishes Dept., Wilmington 98, Del.
Durabla Mfg. Co., 114 Liberty St., New York 6, N. Y.
Durakool, Inc., 1010 N. Main St., Elkhart, Ind.
Duraloy Co., Scottdale, Pa.
Durante Insulated Pipe Line Co., 1015 Runnymede, E., Palo Alto, Calif.
Duriron Co., Inc., The, 450 N. Findlay St., Dayton 1, O.
Duro Co., 537 Monument Ave., Dayton, O.
Duro Metal Products Co., 2649 N. Kildare Ave., Chicago, Ill.
Dust Filter Co., 4418 N. Clark St., Chicago 40, Ill.
Dustlix Corp., 715 N. Van Buren St., Milwaukee, Wis.
Dwyer Mfg. Co., F. W., 565 W. Washington Blvd., Chicago 6, Ill.
• Dynamic Air Engineering, Inc., 1619 S. Alameda, Los Angeles 21, Calif.
Eclipse Air Brush Co., Inc., 381 Park Ave., Newark, N. J.
Eclipse Fuel Engineering Co., 707 S. Main St., Rockford, Ill.
Econocol Stoker Div. of Cotta Transmission Co., 2340 11th St., Rockford, Ill.
Economy Equipment Co., 223 N. Wolcott Ave., Chicago, Ill.
Economy Pumps, Inc., 1000 Weller Ave., Hamilton, O.
Economy Valve Seat Co., 2807-13 Fletcher St., Chicago 18, Ill.
Eddy Stoker Corp., 4717 W. North Ave., Chicago 39, Ill.
Eddy Valve Co., Waterford, N. Y.
Edge Moor Iron Wks., Inc., Edge Moor 25, Del.
Edison General Electric Appliance Co., Inc., 5600 W. Taylor St., Chicago 44, Ill.
Edison, Inc., Thomas A., Instrument Div., Lakeside Ave., West Orange, N. J.
Edward Valve & Mfg. Co., Inc., 1200 W. 145th St., East Chicago, Ind.
Edwards Mfg. Co., Inc., 337 Eggleston Ave., Cincinnati 2, O.
Ehret Magnesia Co., Valley Forge, Pa.
Eiker Mfg. Co., Ogallala, Nebr.
Eimer & Amend, 635 Greenwich St., New York, N. Y.
Eisler Engineering Corp., 754 S. 13th St., Newark 3, N. J.
Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J.
Electric Arc, Inc., 152 Jelliff Ave., Newark 8, N. J.
Electric Auto-Lite Co., Instrument & Gauge Div., Caledonia and Gillette Sts., La Crosse, Wis.
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, O.
Electric Machinery Mfg. Co., 1331 Tyler St., N. E., Minneapolis 13, Minn.
Electric Sprayit Co., The, 1415-25 Illinois Ave., Sheboygan, Wis.
Electric Valve Mfg. Co., Inc., 68 Murray St., New York, N. Y.
• Electrimatic, 2100 Indiana Ave., Chicago 16, Ill.
Electroaire Corp., 1455 W. Congress St., Chicago 7, Ill.
Electrol Mfg. Co., 253 Chestnut St., Passaic, N. J.
Electromode Corp., Div. of American Foundry Equipment Co., Mishawaka, Ind.
Electro-Switch & Controls Co., 5607 W. Adams Blvd., Los Angeles 16, Calif.
Electrovent Fan & Mfg. Co., 812 W. Lake St., Chicago 7, Ill.
Elgin Softener Corp., Elgin, Ill.
Elgo Shutter & Mfg. Co., 6970 W. Jefferson Ave., Detroit 17, Mich.
Elliott Co., Jeannette, Pa.
Ellis Drier Co., 2444 N. Crawford Ave., Chicago 39, Ill.
Ellison Draft Gage Co., 214 W. Kinzie St., Chicago 10, Ill.
Ellsworth Pipe & Supply Co., 1739 W. St. Paul Ave., Milwaukee 3, Wis.
Elsey Metal Specialties Co., 1535 Spruce St., Detroit, Mich.
Emerson Electric Mfg. Co., The, 1847 Washington Ave., St. Louis 3, Mo.
Empire Sheet & Tin Plate Co., N. Bowman St., Mansfield, O.
Empire Ventilation Equipment Co., 35-39 Vernon Blvd., Long Island City 1, N. Y.
Endura Mfg. Corp., 45 N. 4th St., Quakerstown, Pa.
Engelhard, Inc., Charles, 90 Chestnut St., Newark, N. J.
Engineer Co., 75 West St., New York 6, N. Y.
Enterprise Engine & Foundry Co., 2949 18th St., San Francisco 10, Calif.
Equipoise Controls, 342 Madison Ave., New York 17, N. Y.
Erdle Perforating Co., 171 York St., Rochester 11, N. Y.
Ergolyte Mfg. Co., 3627 Lawrence St., N., Philadelphia 40, Pa.
Erie Bolt & Nut Co., Erie, Pa.
Erie City Iron Wks., 1450 East Ave., Erie, Pa.
Erie Tool Wks., 11th & French Sts., Erie 2, Pa.
Ess Instrument Co., Fort Lee, N. J.
Ess Specialty Corp., 96 W. Washington Ave., Bergenfield, N. J.
Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif.
Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
Everhot Products Co., 2059 W. Carroll, Chicago 12, Ill.
Everite Pump & Mfg. Co., Inc., P. O. Box 1391, Lancaster, Pa.
Everlasting Valve Co., 49 Fisk St., Jersey City 5, N. J.
Excelsior Leather Washer Mfg. Co., 720-730 Chestnut St., Rockford, Ill.
Excelsior Steel Furnace Co., The, 118 S. Clinton St., Chicago 6, Ill.
Excelsior Tool & Machine Co., 31st & Ridge Ave., East St. Louis, Ill.
• Extended Surface, Div. of David E. Kennedy, Inc., 68 Second Ave., Brooklyn 15, N. Y.
Extruded Plastics, Inc., New Canaan Ave., Norwalk, Conn.
Fafnir Bearing Co., 37 Booth St., New Britain, Conn.
Fairbanks Co., 393 Lafayette St., New York 3, N. Y.
Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.
Fairbanks Morse & Co., Pomona Works, 206 E. Commercial St., Pomona, Calif.
Fairmont Aluminum Co., Fairmont, W. Va.
Falcon Equipment Co., 13th St., New Brighton, Pa.
Falstrom Co., Main Ave. & D. L. & W. R. R., Passaic, N. J.

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Farquhar Co., Ltd., A. B., Duke St., York, Pa.
• Farr Co., 2615 Southwest Dr., Los Angeles 43, Calif.
Farrar & Trefts, 20 Milburn St., Buffalo 12, N. Y.
Farris Engineering Co., Palisades Park, N. J.
Fedders-Quigan Corp., 81 Tonawanda St., Buffalo 7, N. Y.
Federal Machine & Welder Co., 212 Dana St., Warren, O.
Federal-Mogul Corp., 11031 Shoemaker St., Detroit 13, Mich.
Fee & Mason Mfg. Co., Inc., 81 Beekman St., New York 7, N. Y.
Fee and Stemwedel, Inc., 2210 Wabansia Ave., Chicago 47, Ill.
Felt Products Mfg. Co., 1514 Carroll Ave., Chicago 7, Ill.
Felters Co., Inc., 210 South St., Boston 11, Mass.
• Fenwal, Inc., 200 Pleasant St., Ashland, Mass.
Ferguson & Lange Foundry Co., 1039 Willow St., Chicago, Ill.
Fern, Ralph, 2517 Boulevard Ave., Scranton 9, Pa.
Ferro-Enamel Corp., Liquid Plastics Div., 4150 E. 56th St., Cleveland 5, O.
Ferro-Nil Corp., 381 Fourth Ave., New York 16, N. Y.
Fibre Conduit Co., Orangeburg, N. Y.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Filters, Inc., 1515 Gardena St., P. O. Box 471, Glendale, Calif.
Filtrine Mfg. Co., Inc., 53 Lexington Ave., Brooklyn 5, N. Y.
Fingles Co., The, Reistertown Rd. at Elgin Ave. Baltimore 17, Md.
Fireline Stove & Furnace Lining Co., 1800 Kingsbury St., Chicago 14, Ill.
Firemood Machine Wks., Converse, Ind.
Firestone Tire & Rubber Co., S. Main St., Akron, O.
Fir-Tex Insulating Board Co., St. Helens, Ore.
Fischer & Porter Co., 7346 County Line Rd., Hatboro, Pa.
Fish-Schurman Corp., 230 E. 45th St., New York 17, N. Y.
• Fisher Governor Co., 205 S. First Ave., Marshalltown, Ia.
• Fitzgibbons Boiler Co., Inc., 101 Park Ave., New York 17, N. Y.
Flagg & Co., Inc., Stanley G., 1421 Chestnut St., Philadelphia 2, Pa.
Flemm Lead Co., Inc., Bradley Ave. & School St., Long Island City 1, N. Y.
Flexitallic Gasket Co., 8th & Bailey Sts., Camden, N. J.
Flexlock Corp., 411 E. Market St., Akron, O.
Flexo Supply Co., Inc., 4221 Olive St., St. Louis 8, Mo.
Flintkote Co., The, 220 E. 42nd St., New York 17, N. Y.
Flori Pipe Co., The, 601 E. Red Bud Ave., St. Louis 15, Mo.
Floridin Co., Warren, Pa.
Flotrol Systems, Inc., 385 Gerard Ave., New York 51, N. Y.
Fluor Corp., Ltd., The, 2500 S. Atlantic Blvd., Los Angeles 22, Calif.
Flynn & Emrich Co., 301 Holliday St., Baltimore 2, Md.
Follansbee Steel Corp., Pittsburgh, Pa.
Ford Roofing Products Co., 111 W. Washington St., Chicago, Ill.
Forman Air Conditioning & Engrg. Co., 345 W. 40th St., New York 18, N. Y.
Fossum, M. H., 2086 Marshall Ave., St. Paul, Minn.
Foster Engineering Co., 109 Monroe St., Newark, N. J.
Foster Pump Wks., Inc., 46-A Washington St., Brooklyn 1, N. Y.
Foster Wheeler Corp., 165 Broadway, New York 6, N. Y.
Fowler & Wolfe Radiator Co., Oak and Carson Sts., Norristown, Pa.
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Foxboro Co., 106 Neponset Ave., Foxboro, Mass.
France Packing Co., 6512 Tacony St., Tacony, Philadelphia 35, Pa.
Frank Heaters, Inc., 521 E. 40th St., Paterson 14, N. J.
Freed Products Co., 1510 Third Ave., Moline, Ill.
• Freeman Stoker Div., Illinois Iron & Bolt Co., 918 S. Michigan Ave., Chicago 5, Ill.
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Fretz-Moon Tube Co., Inc., Butler, Pa.
Frick Co., Waynesboro, Pa.
Friez Instrument Div., Bendix Aviation Corp., Taylor Ave., Towson, Baltimore 4, Md.
Frigidaire Div., General Motors Corp., Dayton 1, O.
Frost Mfg. Co., S. Henderson St., Galesburg, Ill.
Fuel Savers, Inc., 15th and Herr Sts., Harrisburg, Pa.
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Fuller Co., 124 Bridge St., Catasauqua, Pa.
• Fulton Syphon Co., The, Box 400, Knoxville 4, Tenn.
G. D. S. Machinery & Supply Co., Inc., 101 Walker St., New York, N. Y.
G. M. Mfg. Co., 50 W. 3rd St., New York 12, N. Y.
G & O Mfg. Co., 138 Winchester Ave., New Haven 8, Conn.
Gallaher Co., The, Owatonna, Minn.
Galv-Weld Products, P. O. Box 37, Sta. D, Dayton 10, O.
Garden City Fan Co., 332 S. Michigan Ave., Chicago 4, Ill.
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Gardner-Denver Co., Quincy, Ill.
Garlock Packing Co., 50 Main St., Palmyra, N. Y.
Gasflux Co., Mansfield, O.
Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.
Gatke Corp., 228 N. La Salle St., Chicago, Ill.
• Gehl Bros. Mfg. Co., West Bend, Wis.
Gehri Co., 1117 Tacoma Ave., Tacoma 3, Wash.
General Air Conditioning Corp., 4415 Appleton St., Cincinnati 9, O.
• General Blower Co., 8601 Ferris Ave., Morton Grove, Ill.
General Blower Co., Inc., 5335 Market St., Philadelphia 39, Pa.
General Ceramics Co., Keasbey, N. J.
• General Controls Co., 801 Allen Ave., Glendale 1, Calif.
General Electric Co., Air Conditioning Dept., 5 Lawrence St., Bloomfield, N. J.
General Electric Co., Lamp Dept., Nela Park, Cleveland 12, O.
General Electric Co., Plastics Div., 1 Plastics Ave., Pittsfield, Mass.
General Electric Co., 1 River Rd., Schenectady 5, N. Y.
General Equipment Co., 315 S. Wichita, Wichita, Kans.
• General Fittings Co., 123 Georgia Ave., Providence 5, R. I.
General Gas Light Co., 212 N. Park, Kalamazoo 11F, Mich.
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General Insulating Products Co., 8821 15th Ave., Brooklyn, N. Y.
General Machinery Co., 3500 Riverside Ave., Spokane 1, Wash.
General Motors Corp., 3044 W. Grand Blvd., Detroit 2, Mich.
General Motors Corp., Moraine Products Div., Dayton 1, O.
General Plate Div., Metals & Controls Corp., 34 Forest St., Attleboro, Mass.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
General Sales & Products Co., 242 Saratoga St., Cohoes, N. Y.
General Scientific Equipment Co., 1346 N. Somerset St., Philadelphia 32, Pa.
Genspring, Inc., 500 Fifth Ave., New York 18, N. Y.
Gerett Corp., M. A., 724 W. Winnebago St., Milwaukee 5, Wis.
Gerstein & Cooper Co., 1 W. Third St., South Boston 27, Mass.
Geuder, Paeschke & Frey Co., W. St. Paul Ave. and N. 15th St., Milwaukee, Wis.
Giannini Co., Inc., G. M., 161 E. California St., Pasadena, Calif.
Giant Mfg. Co., South Ave., Council Bluffs, Ia.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Gilbert & Son, Harry E., 220 Brooklawn Terrace, Bridgeport, Conn.
Gillian Mfg. Co., 7752 Dubois St., Detroit 11, Mich.
Gilmer Company, L. H., Div. of United States Rubber Co., 7201 Keystone St., Tacony, Philadelphia 35, Pa.
Gisholt Machine Co., 1253 E. Washington Ave., Madison 3, Wis.
Glaser Lead Co., Inc., 31 Wyckoff Ave., Brooklyn, N. Y.
Gleason-Avery, Inc., 27 Clark St., Auburn, N. Y.
Glidden Co., 11001 Madison Ave., Cleveland, O.
Glo Heat Equipment Co., 1951 Grand Central Terminal Bldg., New York 17, N. Y.
Globe Machine & Stamping Co., Div. of Hupp Motor Car Corp., 1250 W. 76th St., Cleveland 2, O.
Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.
Goese Mfg. Co., 2548 N. 18th St., Milwaukee 6, Wis.
Goethel Sheet Metal Wks., Alfred, 1910 N. Killian Pl., Milwaukee, Wis.
Goettl Bros. Metal Prod. Co., Central Ave., Phoenix, Ariz.
Goetze Gasket & Packing Co., Inc., 60 Allen Ave., New Brunswick, N. J.
Golden-Anderson Valve Specialty Co., Fulton Bldg., Pittsburgh, Pa.
Goldens' Foundry & Machine Co., Columbus, Ga.
Goodrich Co., B. F., 548 S. Main St., Akron 18, O.
Goodyear Tire & Rubber Co., E. Market St., Akron 16, O.
Gorman-Rupp Co., Mansfield, O.
Gorton Heating Corp., Cranford, N. J.
Gotham Instrument Co., 149 Wooster St., New York 17, N. Y.
Goulds Pumps, Inc., Fall St., Seneca Falls, N. Y.
Governair Corp., 617-31 N. W. 2nd St., P. O. Box 1654, Oklahoma City 1, Okla.
Grabler Mfg. Co., 6565 Broadway, Cleveland 5, O.
Graham Mfg. Co., 415 Lexington Ave., New York 17, N. Y.
Graham Transmissions, Inc., 2706 N. Teutonia Ave., Milwaukee, Wis.
Grand Rapids Blow Pipe & Dust Arrester Co., 526-528 Monroe Ave., Grand Rapids 2, Mich.
Grand Rapids Die & Tool Co., 203 Front Ave., N. W., Grand Rapids 4, Mich.
Granite City Steel Co., 20th & Madison Ave., Granite City, Ill.
• Grant Wilson, Inc., 141 W. Jackson Blvd., Chicago 4, Ill.
Graton & Knight Co., 356 Franklin St., Worcester 4, Mass.
Graver Tank & Mfg. Co., Inc., 4809 Todd Ave., East Chicago, Ind.
Gray Metal Products, Inc., 30 Carleton St., Rochester, N. Y.
Great Lakes Steel Corp., Ecorse, Detroit, Mich.
Great National Air Conditioning Co., 2125 N. Harwood St., Dallas 1, Tex.
Green Fire Brick Co., A. P., Mexico, Mo.
Green Fuel Economizer Co., 700 Main St., Beacon, N. Y.
Greene, Tweed & Co., 4377 Bronx Blvd., New York 66, N. Y.
Greenfield Tap & Die Corp., Sanderson St., Greenfield, Mass.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., 2136 12th St., Rockford, Ill.
Greiner Co., Emil, 161 Sixth Ave., New York, N. Y.
Grief, Edward C., 64 West End Ave., Bogota, N. J.
Griffith Equipment Co., Inc., Los Angeles, Calif.
• Grinnell Co., Inc., 260 W. Exchange, Providence 1, R. I.
Griscom-Russell Co., The, 285 Madison Ave., New York 17, N. Y.
Grobet File Corp. of America, 3 Park Pl., New York, N. Y.
Grove Regulator Co., 1190 67th St., Oakland, Calif.
Guardian Electric Mfg. Co., 1400 Washington Blvd., Chicago 7, Ill.
Guardian Utilities Co., 215 E. Michigan St., Michigan City, Ind.
Guild & Garrison, Inc., 43 Keap St., Brooklyn 11, N. Y.
Gustin Bacon Mfg. Co., 1412 W. 12th St., Kansas City, 7, Mo.
Guth Co., Edwin F., 2615 Washington Blvd., St. Louis 3, Mo.
Gylstrom Co., O., 108 W. Wells St., Milwaukee, Wis.
H. & A. Co., 86-100 Leroy Ave., Buffalo 14, N. Y.

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H-B Instrument Co., 2518 N. Broad St., Philadelphia 32, Pa.
H. & B. Sales Co., Ltd., 2875 Cherry Ave., Long Beach, Calif.
Haering Co., Inc., D. W., 205 W. Wacker Dr., Chicago 6, Ill.
• Hagan Corp., 600 Bowman Bldg., Pittsburgh 30, Pa.
Hague & Co., Alfred, 230 Thirty-fourth St., Brooklyn 32, N. Y.
• Hames & Co., William S., 12th & Buttonwood Sts., Philadelphia 23, Pa.
Halowax Products Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Hamburg Boiler Wks., Inc., Grand St., Hamburg, Pa.
Hamilton Rubber Mfg. Co., Mead St., Trenton, N. J.
Hamer Oil Tool Co., 2919 Gardenia Ave., Long Beach 7, Calif.
Hammel-Dahl Co., 243 Richmond St., Providence, R. I.
Hammett Electric Mfg. Co., 2558 McGee Trafficway, Kansas City 8, Mo.
Hammond Brass Wks., Sumner Blvd., Hammond, Ind.
Hampton-Cross Co., The, 1014 W. Main St., Louisville, Ky.
Hampton Electric Mfg. Co., 12th St. and Pine Pl., New Kensington, Pa.
Hancock Valve Div., Manning, Maxwell & Moore Inc., 11 Elias St., Bridgeport 2, Conn.
Handley Brown Heater Co., 209 E. Washington Ave., Jackson, Mich.
• Handy & Harman, 82 Fulton St., New York 7, N. Y.
• Hansen Mfg. Co., Inc., Princeton 6, Ind.
Hardinge Oil Burner & Mfg. Co., 1770 Berteau St., Chicago 13, Ill.
Hardy, Inc., Charles, 420 Lexington Ave., New York, N. Y.
Hare Engineering Co., 155 W. Congress St., Detroit 26, Mich.
Harman Equipment Co., 937 Santa Fe Ave., Los Angeles 21, Calif.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee, Wis.
Harper Co., H. M., 2620 W. Fletcher, Chicago, Ill.
Harrington & King Perforating Co., 5655 Fillmore St., Chicago 44, Ill.
Harris, A. R., 4546 Hohman Ave., Hammond, Ind.
Harris Calorific Co., The, 5501 Cass Ave., N. W., Cleveland, O.
Harris & Co., Arthur, 210 N. Aberdeen St., Chicago 7, Ill.
Harrisburg Machinery Corp., 7th & Curtin St., Harrisburg, Pa.
Harrisburg Steel Corp., 10th & Herr Sts., Harrisburg, Pa.
Harry Cooling Towers, Inc., 554 W. 48th St., New York 19, N. Y.
Hart & Cooley Mfg. Co., Holland, Mich.
Hart Mfg. Co., The, Hamilton St., Hartford 1, Conn.
Hartmann Co., Chas., 985 Dean St., Brooklyn, N. Y.
Hartwell Engineering Co., 3417 Cranshaw Blvd., Los Angeles 16, Calif.
Hartzell Propeller Fan Co., P. O. Box 909, Roosevelt Ave., Piqua, O.
Harvey-Whipple, Inc., Springfield, Mass.
Hasco Valve & Machine Co., 1819 W. St. Paul Ave., Milwaukee 3, Wis.
Haskell Mfg. Co., Wm. H., 20 Commerce St., Pawtucket, R. I.
Hastings Air Conditioning Co., Box 481, 108 S. Colorado Ave., Hastings, Nebr.
Haveg Corp., Newark, Del.
• Hays Corp., 782 E. 8th St., Michigan City, Ind.
Hays Mfg. Co., 801 W. 12th St., Erie, Pa.
Healy Ruff Co., 2257 University Ave., St. Paul 4, Minn.
Heartley Machine & Tool Co., 900-8 Summit St., Toledo, O.
Heat Timer Corp., 160 Fifth Ave., New York 10, N. Y.
Heat Transfer Products, Inc., P. O. Box 516, Carbondale, Pa.
Heating Assurance, Inc., 124 E. Augusta St., Spokane, Wash.
Hegeler Zinc Co., P. O. Box 599, Danville, Ill.
Helicoid Gage Div., American Chain & Cable Co., Maytag Bldg. at 34th St., Long Island City 1, N. Y.
Hendley & Whittemore, 6 Blackhawk Blvd., Beloit, Wis.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Henry Co., Paul, The, Controls Div., 2037 S. LaCienega Blvd., Los Angeles 34, Calif.
Henry Furnace Co., The., Medina, O.
• Henry Valve Co., 3260 W. Grand Ave., Chicago 51, Ill.
Henry & Wright Mfg. Co., 760 Windsor St., Hartford, Conn.
Herbert Boiler Co., 2300 Bloomingdale Ave., Chicago, Ill.
Her-Born Engineering & Mfg. Co., 212 Columbus Ave., Sandusky, O.
Herbusch Corp., The, 706 Chestnut St., 210 Title Guaranty Bldg., St. Louis 1, Mo.
Hercules Chemical Co., Inc., 332 Canal St., New York 13, N. Y.
Hercules Electric & Mfg. Co., Inc., 2500 Atlantic Ave., Brooklyn 7, N. Y.
Hercules Float Wks., 200 Franklin St., Springfield, Mass.
Hersey Mfg. Co., South Boston, Mass.
Hershey Machine & Foundry Co., Motorstoker Div., Manheim, Pa.
Hess Warming & Ventilating Co., 1211 S. Western Ave., Chicago, Ill.
Hetzel Roofing Products Co., 67 Maine St., Newark 5, N. J.
Highside Chemicals Co., 195 Verona Ave., Newark 4, N. J.
Hill Diesel Engine Co., Lansing 3, Mich.
Hill, E. Vernon, 6826 W. Highland Ave., Chicago 31, Ill.
Hilo Varnish Corp., 42-60 Stewart Ave., Brooklyn, N. Y.
Hinde & Dauch Paper Co., P.O. Box 861, Sandusky, O.
Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Hobart Bros. Co., Troy 1, O.
Hodge Boiler Wks., Sumner St., East Boston 28, Mass.
Hodgman Mfg. Co., 135 Washington St., Taunton, Mass.
Hodgman Rubber Co., Framingham, Mass.
• Hoffman Specialty Co., 1001 York St., Indianapolis 7, Ind.
Holby Valve Co., 1146 Second Ave., New York 21, N. Y.
Holcomb & Hoke Mfg. Co., 1545 Van Buren, Indianapolis 7, Ind.
Hollands Mfg. Co., Erie, Pa.
Hollup Corp., Div. of National Cylinder Gas Co., 4700 W. 19th St., Chicago 50, Ill.
Holsclaw Bros., Inc., Evansville 11, Ind.
Holtum Mfg. Co., Freeport, Ill.
Holtzer-Cabot, Div. First Industrial Corp., 125 Amory St., Boston 19, Mass.
Homestead Valve Mfg. Co., P. O. Box 348, Coraopolis, Pa.
Hood Refining Co., 182 N. Hamilton Ave., Greensburg, Pa.
Hoppes Mfg. Co., 850 N. Belmont Ave., N. Springfield, O.
Horn Co., A. C., 43-36 Tenth St., Long Island City, N. Y.
Horton Mfg. Co., 3016 University Ave., S. E., Minneapolis 14 Minn.
Hossfeld Mfg. Co., 460 W. Third St., Winona, Minn.
Hotstream Heater Co., 2363 E. 69th St., Cleveland 4, O.
Houghton & Co., E. F., 303 W. Lehigh Ave., Philadelphia 33, Pa
Howard Iron Wks. & Alberger Heater Co., 287 Chicago St., Buffalo 4, N. Y.
Howe Ice Machine Co., 2825 Montrose Ave., Chicago 18, Ill.
Howell Electric Motors Co., Howell, Mich.
Howes-Woods Co., 201 Bridge St., Cambridge, Mass.
Hubbard Co., 1014 Marquette Ave., Minneapolis, Minn.
Hubbell Corp., 319 N. Albany Ave., Chicago 12, Ill.
Humboldt Mfg. Co., 2016 N. Whipple St., Chicago, Ill.
Hunt & Son, C. B., Salem, O.
Hunter Fan & Ventilating Co., Inc., 400 S. Front St., Memphis, Tenn.
Hunter Machine Co., James, North Adams, Mass.
Hussey & Co., C. G., 2850 Second Ave., Pittsburgh 19, Pa.
Huyette Co., Inc., Paul B., 401 N. Broad St., Philadelphia 8, Pa
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Hynes Electric Heating Co., West and Clinton Sts., Camden, N. J.

• Ice-Air Conditioning Co., Inc., 794-6 Union St., Brooklyn 15, N. Y.
Ice Cooling Appliance Corp., Morrison, Ill.
Ideal Commutator Dresser Co., 1096 Park Ave., Sycamore, Ill.
Ideal Electric & Mfg. Co., E. First & Oak Sts., Mansfield, O.
• Ilg Electric Ventilating Co., 2841 N. Crawford Ave., Chicago 41, Ill.
• Illinois Engineering Co., 2035 S. Racine Ave., Chicago 8, Ill.
Illinois Malleable Iron Co., 1801 Diversey Parkway, Chicago 14, Ill.
Illinois Oil Co., 4th Ave. and 24th St., Rock Island, Ill.
• Illinois Testing Laboratories, 420 N. La Salle St., Chicago 10, Ill.
Illinois Zinc Co., 2959 W. 47th St., Chicago 32, Ill.
Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7, Ill.
Imperial Electric Co., 64 Ira Ave., Akron, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Independent Register Co., 3747 E. 93rd St., Cleveland 5, O.
Indiana Fan Company, 36 E. South St., Indianapolis 4, Ind.
Industrial Engineering Corp., Terre Haute, Ind.
Industrial Mfg. & Engineering Co., 3845 N. Ravenswood Ave., Chicago 13, Ill.
Industrial Research, Lansdowne, Pa.
Industrial Screw Co., 711 W. Lake St., Chicago 6, Ill.
Industrial Service Laboratories, 7656 W. Forest Home Ave., Milwaukee 14, Wis.
• Ingersoll Steel Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Inner-Tite Div. of Yara Engineering Corp., 18 W. Jersey St., Elizabeth 4, N. J.
Instant Drying Corp. 101 Park Ave., New York, N. Y.
Insto-Gas Corp., 1900 E. Jefferson, Detroit 7, Mich.
Instrument Engineering Associates, 134 Broadway, Brooklyn 11, N. Y.
Insulite Div. Minnesota and Ontario Paper Co., 500 Baker Arcade Bldg., Minneapolis 2, Minn.
Insul-Wool Insulation Corp., Wichita 12, Kans.
Inter-Coastal Paint Corp., 13th St. and Southern R. R., East St. Louis, Ill.
International Boiler Works, East Stroudsburg, Pa.
International Correspondence Schools, Scranton, Pa.
International Engineering, Inc., 1145 Bolander Ave., Dayton 1, O.
International Engineering Wks., Inc., Box 71, Framingham, Mass.
International Heater Co., 101 Park Ave., Utica 2, N. Y.
International Moistening Co., 489 S. Main St., Providence, R. I.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
International Nutyp Tool Co., 68 W. First St., Oswego, N. Y.
International Register Co., 2620 W. Washington Blvd., Chicago 12, Ill.
International Sales Co., 2045 Evans Ave., San Francisco 24, Calif.
International Steel Co., 1545 Edgar St., Evansville, Ind.
International Vermiculite Co., Girard, Ill.
Iona Ventilator Co., Inc., 2821-29 W. Dauphin St., Philadelphia 32, Pa.
Iowa Paint Mfg. Co., 118-20 Eighth St., Des Moines, Ia.
Iron Fireman Mfg. Co., 3085 W. 106th St., Cleveland 11, O.
Irvington Varnish and Insulator Co., 6 Argyle Terrace, Irvington 11, N. J.
Iwan Brothers, Inc., 1503 Prairie Ave., South Bend 14, Ind.

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J O Mfg. Co., South Gate, Calif.
Jabsco Pump Co., 8306 Wilshire Blvd., Beverly Hills, Calif.
Jackson Co., Byron, P. O. Box 2017, Terminal Annex, Los Angeles 54, Calif.
• Jackson & Church Co., 321 N. Hamilton Ave., Saginaw 65, Mich.
Jacobs Co., B. & J., 1729 John St., Cincinnati, O.
Jaden Mfg. Co., 1601 Second St., Hastings, Nebr.
Jamar Co., Walker, 367 S. First Ave., E. Duluth, Minn.
Jamieson Mfg. Co., 820 Eagle Ford Rd., Dallas, Tex.
• Janette Mfg. Co., 556 W. Monroe St., Chicago 6, Ill.
Jarecki Mfg. Co., 1345 W. 12th St., Erie, Pa.
Jefferson Electric Co., 25th & Madison St., Bellwood, Ill.
• Jefferson Union Co., 601 W. 26th St., New York 1, N. Y.
Jeffrey Mfg. Co., 859-99 N. Fourth St., Columbus 16, O.
• Jenkins Bros., 80 White St., New York 13, N. Y.
Jennison Co., 17 Putnam St., Fitchburg, Mass.
Jessop Steel Co., Washington, Pa.
Jewel Mfg. Co., 1841 University Ave., St. Paul 4, Minn.
Joal Mfg. Corp., 2058 Canton St., Toledo 2, O.
Johns-Manville, 22 E. 40th St., New York 16, N. Y.
Johnson Bronze Co., 460 S. Mill St., New Castle, Pa.
Johnson Co., Lloyd S., 2241 Indiana Ave., Chicago 16, Ill.
Johnson Co., S. T., 940 Arlington St., Oakland 8, Calif; 401 N. Broad St., Philadelphia 8, Pa.
• Johnson Corp., 806 Wood St., Three Rivers, Mich.
• Johnson Fan & Blower Corp., 1319 W. Lake St., Chicago 7, Ill.
Johnson Gas Appliance Co., 520 "E" Ave., N. W., Cedar Rapids, Ia.
Johnson & Jennings, 877 Addison Rd., Cleveland 14, O.
• Johnson Service Co., 507 E. Michigan St., Milwaukee 2, Wis.
Johnston Bros., Inc., Ferrysburg, Mich.
Johnston & Chapman Co., 2925 Carroll Ave., Chicago 12, Ill.
Johnston Co., William W., 115 Bayard St., Dayton, O.
Johnston Tin Foil & Metal Co., The, 6100 S. Broadway, St. Louis 11, Mo.
Joliet Chemicals, Inc., Industry Ave., Joliet, Ill.
Jones Foundry & Machine Co., W. A., 4401 Roosevelt Rd., Chicago 24, Ill.
Jones & Laughlin Steel Corp., Third Ave. & Ross St., Pittsburgh 30, Pa.
Jordan & Co., Inc., Paul R., 311 E. South St., Indianapolis 4, Ind.
Justus Steam Trap Co., Napanoch, N. Y.

Kainer & Co., 763 W. Lexington St., Chicago 7, Ill.
Kaiser Co., H. S., 3336 Franklin Blvd., Chicago, Ill.
Kaltenthaler Co., H. J., 236 Cherry St., Philadelphia 6, Pa.
Kane Mfg. Corp., Kane, Pa.
Kauffman Air Conditioning Corp., 4336 W. Pine Blvd., St. Louis 8, Mo.
Kaufman Co., H. J., The, 13215 Roselawn Ave., Detroit 4, Mich.
Kaye & MacDonald, Inc., 88-96 Franklin Ave., West Orange, N. J.
Keasbey Co., Robert A., 139-149 W. 19th St., New York, N. Y.
Keasbey & Mattison Co., Butler Ave., Ambler, Pa.
Keckley Co., O. C., 400 W. Madison St., Chicago 6, Ill.
Keeler Co., E., 238 West St., Williamsport 3, Pa.
Keeney Mfg. Co., Main St., Newington 11, Conn.
Kehm Corp., The, 135 S. La Salle St., Chicago 3, Ill.
Keldur Corp., 420 Lexington Ave., New York 17, N. Y.
Keller Tool Co., P. O. Box 268, Grand Haven, Mich.
Kellogg Co., M. W., The, 225 Broadway, New York 7, N. Y.
Kelly-Koet, Covington, Ky.
Kelvin-White Co., 90 State St., Boston 9, Mass.
Kelvinator Div., Nash-Kelvinator Corp., 14250 Plymouth Rd., Detroit 32, Mich.
• Kennard Corp., 2019 S. Hanley Rd., St. Louis 17, Mo.
Kennedy, Inc., David E., 60 Second Ave., Brooklyn, N. Y.
• Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kerentoff, G. L., 2218 Reading Rd., Cincinnati 2, O.
Kernchen Co., 103 E. Wacker Drive, Chicago, Ill.
Kerotest Mfg. Co., 2525 Liberty Ave., Pittsburgh 22, Pa.
Kester Solder Co., 4201 Wrightwood Ave., Chicago 39, Ill.
• Kewanee Boiler Corp., Franklin St. and "Q" Tracks, Kewanee, Ill.
• Key Co., 2661 McCasland, East St. Louis, Ill.
Keystone Asphalt Products Co., 43 E. Ohio St., Chicago, Ill.
Keystone Carbon Co., Inc., St. Marys, Pa.
Kidder Mfg. Co., Inc., J. F., 426 Colchester Ave., Burlington, Vt.
• Kieley & Mueller, Inc., 2015 43rd St., North Bergen, N. J.
Kimball-Krogh Pump Div., Food Machinery Corp., 301 West Ave. 26, Los Angeles, Calif.
Kimberly-Clark Corp., Neenah, Wis.
Kinetic Chemicals, Inc., 10th & Market St., Wilmington 98, Del.
King Engineering Corp., 945 Willard Ave., Ann Arbor, Mich.
King Union Co., Inc., Hillsgrove, R. I.
King Ventilating Co., Box 178, Owatonna, Minn.
Kingsford Foundry & Machine Wks., 264 W. Second St., Oswego, N. Y.
Kingston Products Corp., 1415 N. Webster, Kokomo, Ind.
Kinney Mfg. Co., 3529 Washington St., Boston 30, Mass.
Kirk & Blum Mfg. Co., 2838-52 Spring Grove Ave., Cincinnati, O.
Kisco Boiler & Engineering Co., 3732-40 Chouteau Ave., St. Louis 10, Mo.
Kitson Co., 1500 Walnut St., Philadelphia 2, Pa.
Klauer Mfg. Co., 9th and Washington Sts., Dubuque, Ia.
Klee Co., Geo. B., 3501-27 Colerain Ave., Cincinnati 23, O.
Kleenaire Corp., 409 Jefferson St., Stevens Point, Wis.
Kleen-Heet, Inc., 1823 Carroll Ave., Chicago 12, Ill.
Klingerit, Inc., 16-22 Hudson St., New York 13, N. Y.
Klipfel Mfg. Co., 2651 W. Harrison St., Chicago 12, Ill.
Klomparens Lock-Joint Mfg. Co., Inc., 4600 Bowen Rd., S. E. Washington 19, D. C.
Kluegel & Co., E., 187 W. Kellogg Blvd., St. Paul, Minn.
Knickerbocker Co., 603 Liberty St., Jackson, Mich.
Knight, Maurice A., Kelly Ave., Akron 9, O.
Knowles Mushroom Ventilator Co., 11 Label St., Montclair, N. J.
Kohler Co., P. O. Box A, Kohler, Wis.
Kol-Master Corp., 161 Walberg St., Oregon, Ill.
Kopperman & Sons, Joseph, 316 New St., Philadelphia 6, Pa.
Koppers Co., Bartlett Hayward Div., 200 Scott St., Baltimore, Md.
Korfund Co., Inc., 48-36 32nd Pl., Long Island City 1, N. Y.
Koven & Bro., L. O., Inc., 154 Ogden Ave., Jersey City, N. J.
Kraissl Co., Inc., The, Terhune and Williams Aves, Hackensack, N. J.
Kramer Trenton Co., 626 Brunswick Ave., Trenton 5, N. J.
Krehbiel Co., J. H., 425 N. Crawford Ave., Chicago, Ill.
Kresno-Stamm Mfg. Co., 730 Sixth Ave., New York 10, N. Y.
Krez Co., Paul J., 444 N. LaSalle St., Chicago, Ill.
• Krueger Sentry Gauge Co., 1056 W. Mason St., Green Bay, Wis.
Kuhlman Electric Co., Detroit Electric Furnace Div., Bay City, Mich.
• Kuhns Bros. Co., Dayton 1, O.
Kunkle Valve Co., 121 S. Clinton St., Ft. Wayne 2, Ind.
Kwikon Co., 626 W. Jackson Blvd., Chicago, Ill.

L-R Mfg. Co., Blower Div., Torrington, Conn.
La Bour Co., Inc., The, 1301 Sterling Ave., Elkhart, Ind.
Laclede-Christy Clay Products Co., 411 N. Seventh St., St. Louis, Mo.
Laclede Steel Co., Arcade Bldg., Rm. 1317, St. Louis 1, Mo.
Laclede Stoker Co., 4438 Hunt Ave., St. Louis 10, Mo.
La Crosse Steel Roofing & Corrugating Co., 227 Jay St., La Crosse, Wis.
La Crosse Tractor Co., La Crosse, Wis.
• La-Del Conveyor & Mfg. Co., S. Broadway and Mill Ave., New Philadelphia, O.
Ladish Drop Forge Co., Fittings Div., Cudahy, Wis. (Milwaukee Suburb).
• Lake Chemical Co., 607 N. Western Ave., Chicago 12, Ill.
Lamb & Ritchie Co., 250 Albany St., Cambridge, Mass.
Lammert & Mann Co., 281 N. Wood St., Chicago 12, Ill.
Lamson & Sessions Co., 1971 W. 85th St., Cleveland, O.
Landis & Gyr, Inc., 104 Fifth Ave., New York 11, N. Y.
Landis Machine, Inc., Fifth and Church Sts., Waynesboro, Pa.
Larkin Coils, 519 Memorial Dr., S. E., Atlanta 1, Ga.
Larkin Packer Co., 6200 Maple Ave., St. Louis 14, Mo.
Lastik Products Co., Inc., 1106 Keenan Bldg., Pittsburgh 22, Pa.
• Lau Blower Co., 2001 Home Ave., Dayton 7, O.
Lawler Automatic Controls, 453 N. MacQuesten Pkwy., Mount Vernon, N. Y.
Lawrence Pump & Engine Co., P. O. Box 70, Lawrence, Mass.
Layne & Bowler, Inc., Box No. 215, Hollywood Sta., Memphis 8, Tenn.
Leach Relay Co., 5919 Avalon Blvd., Los Angeles 3, Calif.
Lead Lined Iron Pipe Co., 1 Broadway, Wakefield, Mass.
Leavitt Machine Co., East River St., Orange, Mass.
Lecourtenay Co., 5 Maine St., Newark 5, N. J.
Lee Engineering Co., Union National Bank Bldg., Youngstown 3, O.
Lee Co., K. O., Aberdeen, S. D.
Lee & Son, Thomas, 128-132 W. Second St., Cincinnati 2, O.
• Leeds & Northrup Co., 4969 Stenton Ave., Philadelphia 44, Pa.
Lees, John, Div., Serrick Corp., Muncie, Ind.
Leffel & Co., James, 426 East St., Springfield, O.
Lehigh Fan & Blower Co., Front & Linden Sts., Allentown, Pa.
Lehigh Foundries, Inc., Refrigeration Div., Lancaster, Pa.
Lehon Co., 4411 S. Oakley Ave., Chicago, Ill.
Leinweber Fan & Blower Co., 8448 Crandon, Chicago, Ill.
Leland Electric Co., 1501 Webster St., Dayton 1, O.
Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y., and Columbus, O.
Leonard Precision Products Co., 1100 Larson Ave., Garden Grove, Calif.
Leonard Valve Co., Elmwood Station, Providence 7, R. I.
Leslie Co., Valley Brook & Grant Aves., Lyndhurst, N. J.
Leslie Welding Co., 2943 Carroll Ave., Chicago 12, Ill.
Levow, David, 308 W. 20th St., New York 11, N. Y.
Lewellen Mfg. Co., Columbus, Ind.
• Lewin-Mathes Co., Lewin Metals Div., 1195 Chouteau Ave., St. Louis 2, Mo.
Lewis & Co., Inc., Chas. S., 2207 Pine St., St. Louis 3, Mo.
Lewis Laboratories, Inc., Paul, 924 N. Fourth St., Milwaukee 3, Wis.
Leyman Mfg. Corp., John H. McGowan Co. Div., 1416 First National Bank Bldg., Cincinnati 2, O.
Libbey-Owens-Ford Glass Co., Nicholas Bldg., Toledo 3, O.
• Lilie-Hoffman Cooling Towers, Inc., 4239 Duncan Ave., St. Louis 10, Mo.
Limbert & Co., Geo. B., 570 Fulton St., Chicago 6, Ill.
Lincoln Electric Co., The, 12818 Coit Rd., Cleveland 1, O.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Lindsay Corp., The, 222 W. Adams St., Chicago 6, Ill.
Linear Incorporated, N. W. Cor. State Rd. & Levick St., Philadelphia 35, Pa.
Link-Belt Co., 307 N. Michigan Ave., Chicago 1; 300 W. Pershing Rd., Chicago 9, and 2410 W. 18th St., Chicago 8, Ill.; 519 N. Holmes Ave. and 220 S. Belmont Ave., Indianapolis 6.

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Moore Co., Goodloe E., 603 N. Gilbert St., Danville, Ill.
Moore Products Co., H and Lycoming Sts., Philadelphia 24, Pa.
Moore Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.
Moran Flexible Joint Co., Inc., 217 W. Main St., Louisville 2, Ky.
Morehead Mfg. Co., 2455 W. Warren Ave., Detroit 8, Mich.
• Morey, Dan, 814-816 S. Robertson Blvd., Los Angeles 35, Calif.
Morganite Brush Co., Long Island City 1, N. Y.
Morris Machine Wks., 50 E. Genesee St., Baldwinsville, N. Y.
Morrison Products, Inc., E. 168th St. and Waterloo Rd., Cleveland 10, O.
Morse Chain Co., Turner Pl., Ithaca, N. Y.
Mortell Co., J. W., Kankakee, Ill.
Motex Metal Process Corp., 4473-4475 W. Jefferson Ave., Detroit, Mich.
Mouat Vapor Heating Co., The, 1246-1254 W. 4th St., Cleveland 13, O.
Mountain States Equipment Co., 1238 Speer Blvd., Denver 4, Colo.
• Mueller Brass Co., Port Huron, Mich.
Mueller Co., 512 W. Cerro Gordo St., Decatur 70, Ill.
• Mueller Furnace Co., L. J., 2005 W. Oklahoma Ave., Milwaukee 7, Wis.
Mueller Steam Specialty Co., Inc., 40-20 22nd St., Long Island City 1, N. Y.
Multi-Cell Sales Corp., 3420 Nicollet Ave., Minneapolis 8, Minn.
Muncie Gear Wks., Inc., 700 N. Wysor, Muncie, Ind.
• Mundet Cork Corp., 65 S. 11th St., Brooklyn 11, N. Y.
Mundt & Sons, Charles, 53 Fairmount Ave., Jersey City 4, N. J.
Munn & Steele, Inc., 130 Lister Ave., Newark 5, N. J.
Munton Mfg. Co., 9400 Belmont Ave., Franklin Park, Ill.
Murray Iron Wks. Co., 1106 Washington St., Burlington, Ia.
• Murray Mfg. Co., D. J., 1002-24 Third St., Wausau, Wis.
Mutual Chemical Co. of America, 270 Madison Ave., New York 16, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
Myers Electric Co., Inc., 410 Third Ave., Pittsburgh 19, Pa.

• Nash Engineering Co., 307 Wilson Ave., South Norwalk, Conn.
Nason Co., 7663 Epworth Blvd., Detroit 4, Mich.
National Airoil Burner Co., Inc., 1284 E. Sedgley Ave., Philadelphia 34, Pa.
National Aluminate Corp., 6615 W. 66th Pl., Chicago 38, Ill.
National Brass Co., 1603 Madison Ave., Grand Rapids 2, Mich.
National Carbon Co., 30 E. 42nd St., New York 17, N. Y.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6, Ill.
National Engineering & Mfg. Co., 213 W. 19th St., Kansas City, Mo.
National Engineering Products, Inc., Commerce and Savings Bldg., Washington, D. C.
National Gas Burners, Div. of Mid-Continent Metal Products Co., 1960 Clybourn Ave., Chicago 14, Ill.
National Gypsum Co., Delaware Ave., Buffalo, N. Y.
National Heater Co., 401 Essex Bldg., Minneapolis 2, Minn.
National Lead Co., 111 Broadway, New York 6, N. Y.
National Machine Wks., 122 S. Michigan Ave., Chicago, Ill.
National Mfg. Corp., 151 Fillmore Ave., Tonawanda, N. Y.
National Metal Fabricators, 2138 S. Sawyer, Chicago 23, Ill.
National Metal Products Corp., 21 N. Loomis St., Chicago, Ill.
National Meter Co., 4221 First Ave., Brooklyn 32, N. Y.
National Pipe Bending Co., 122 River St., New Haven 13, Conn.
• National Radiator Co., The, 221 Central Ave., Johnstown, Pa.
National Safety Device Co., 1039 N. Crosby St., Chicago 10, Ill.
National Steam Pump Co., 701 W. Johnson St., Upper Sandusky, O.
National Time & Signal Corp., 600 E. Milwaukee Ave., Detroit, Mich.
National Tube Co., United States Steel Corp. Subsidiary, Frick Bldg., Pittsburgh 30, Pa.
National Valve & Mfg. Co., 3101 Liberty Ave., Pittsburgh 1, Pa.
Naugatuck Mfg. Co., Union City, Conn.
• Naylor Pipe Co., 1251 E. 92nd St., Chicago 19, Ill.
Nebel Mfg. Co., P. O. Box 3942, Shaker Sta., Cleveland 20, O.
Neemes Foundry, Inc., 216 First St., Troy, N. Y.
Nelson Chemical Pumps, Box 2235, Casper, Wyo.
Nelson Co., 2604 Fourth Ave., Detroit, Mich.
Nelson Corp., Herman, 1824 Third Ave., Moline, Ill.
Nelson Mfg. Co., B. F., 401 Main St., N. E., Minneapolis 13, Minn.
Nelson Specialty Welding Equipment Corp., 440 Peralta Ave., San Leandro, Calif.
Neptune Meter Co., 50 W. 50th St., New York 20, N. Y.
• Nesbitt, Inc., John J., State Rd. & Rhawn St., Philadelphia 36, Pa.
Nevinger Mfg. Co., Inc., Greenville, Ill.
New Albany Machine Mfg. Co., E. 10th & Water Sts., New Albany, Ind.
New Departure Div., General Motors Corp., Bristol, Conn.
• New England Cooling Tower Co., 89 Broad St., Boston 10, Mass.
New Haven Copper Co., Seymour, Conn.
New Jersey Zinc Sales Co., Front & Fletcher Sts., New York 7, N. Y.
New York Air Valve Corp., 611-621 Broadway, New York, N. Y.
New York Blower Co., 3159 Shields Ave., Chicago 16, Ill.
New York Brass Foundry, 405 Broome St., New York, N. Y.
Newark Wire Cloth Co., 351 Verona Ave., Newark 4, N. J.
Newman Brothers, Inc., 666 W. Fourth St., Cincinnati, O.
Newman Co., Inc., I. C., 6 E. 45th St., New York 17, N. Y.
Newport Rolling Mill Co., Div. of The Andrews Steel Co., Ninth & Lowell Sts., Newport, Ky.
Niagara Blower Co., 6 E. 45th St., New York 17, N. Y.
Niagara Machine & Tool Wks., 637-697 Northland Ave., Buffalo 11, N. Y.
Nice Ball Bearing Co., 30th and Hunting Park Ave., Philadelphia 40, Pa.
Nicholson & Co., W. H., 12 Oregon St., Wilkes-Barre, Pa.
Niles Rolling Mill Co., Niles, O.
Noera Mfg. Co., Div. Chase Brass & Copper Co., Waterbury 91, Conn.
Norgren Co., C. A., 222 Santa Fe Dr., Denver 9, Colo.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Norristown Magnesia & Asbestos Co., Washington St., Norristown, Pa.
North American Fibre Products Co., The, Standard Bldg., Cleveland 13, O.
North American Mfg. Co., 2910 E. 75th, Cleveland 4, O.
North American Phillips Co., Inc., 100 E. 42nd St., New York 17, N. Y.
North Penn Co., 72 Fifth Ave., New York 11, N. Y.
Northern Blower Co., 6409 Barberton Ave., Cleveland 2, O.
Northern Equipment Co., 1945 Grove Drive, Erie 6, Pa.
Northern Indiana Brass Co., 935 Plum St., Elkhart, Ind.
Northern Steel & Stoker Corp., 3100 Prospect Rd., Peoria 4, Ill.
Northern Weatherstrip Co., 367 S. First Ave., E. Duluth, Minn.
Northwest Foundry & Furnace Co., 2345 S. E. Gladstone St., Portland 2, Ore.
Northwest Lead Co., 2760 16th Ave., S.W., Seattle 4, Wash.
Norwin Co., E. Album St., Freeport, Ill.
Norwood Filtration Co., The, N. Maple St., Florence, Mass.
Nu-Way Corp., 2416 4th Ave., Rock Island, Ill.
Nye Tool & Machine Co., 4120-30 Fullerton Ave., Chicago 39, Ill.

Oakite Products, Inc., 22 Thames St., New York 6, N. Y.
Oberdorfer Brass Co., M. L., 2307 Thompson Rd., Syracuse, N. Y.
O'Brien Steam Specialty Co., 205 Harrison St., Syracuse 2, N. Y.
O'Brien Varnish Co., South Bend 21, Ind.
Ohio Brass Co., 380 N. Main St., Mansfield, O.
Ohio Electric Mfg. Co., 5925 Maurice Ave., Cleveland 4, O.
Ohio Injector Co., 275 Main St., Wadsworth, O.
Ohio Pattern Works & Foundry Co., 2735 Colerain Ave., Cincinnati 25, O.
Ohio Pipe Reading & Machine Co., 3900-3910 Trent Ave., Cleveland 9, O.
Ohio Products Co., 16113 Munn Rd., Cleveland 11, O.
Ohl & Son, George A., 159 Oraton St., Newark, N. J.
Ohmlac Paint & Refining Co., 6550 S. Central Ave., Chicago 38, Ill.
Oil Heat Master National Sales, 4269-81 Park Ave., New York 57, N. Y.
Oiljack Mfg. Co., Inc., Montclair, N. J.
Oil Well Supply Co., Oil City, Pa.
Olsen Testing Machine Co., Tinius, 12th and Buttonwood Sts., Philadelphia, Pa.
O'Malley Valve Co., Edward, 231 E. 95th St., Chicago, Ill.
O'Neil Irwin Mfg. Co., 316 Eighth Ave., S., Minneapolis 15, Minn.
Ormsby-Osterman, Inc., 3631 Cass Ave., St. Louis, Mo.
Orr & Sembower, Inc., Box 1138, Reading, Pa.
Osborn Co., The J. M. & L. A., Div. of Milcor Steel Co., 1541 E. 38th St., Cleveland 14, O.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.
Oster Mfg. Co., 2057 E. 61st Pl., Cleveland 3, O.
Ostlind Valve, Inc., 601 N. E. 28th Ave., Portland 12, Ore.
OverSpred Stoker Co., 77 W. Washington St., Suite 1702, Chicago 2, Ill.
Owens-Corning Fiberglas Corp., 1842 Nicholas Bldg., Toledo 1, O.
Ozalid Products Div., General Aniline & Film Corp., Ansco Rd., Johnson City, N. Y.
Ozone Air Co., 928 Cherry St., S.E., Grand Rapids, Mich.
Ozone Processes, Inc., 1500 Walnut St., Philadelphia 2, Pa.

Pacific Lumber Co., The, 100 Bush St., San Francisco 4, Calif.
Pacific Pump Works, 5716 Bickett St., Huntington Park, Calif.
Pacific States Felt & Mfg. Co., Inc., 845 Howard St., San Francisco, Calif.
Pacific Steel Boiler Div., United States Radiator Corp., 1500 United Artists Bldg., Detroit 31, Mich.
Packless Metal Products Corp., 31 Winthrop Ave., New Rochelle, N. Y.
Page Steel & Wire, Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Paine Co., 2951 W. Carroll Ave., Chicago 12, Ill.
Pains Fireworks Display Co., Inc., 11 Park Pl., New York 7, N. Y.
Palmer Co., 2501 Norwood Ave., Cincinnati (Norwood) 12, O.
Palmer Electric Co., 20 Sproat St., Detroit 1, Mich.
Palmer Mfg. Corp., 705 W. Jefferson St., Phoenix, Ariz.
Palnut Co., 73 Cordier St., Irvington, N. J.
Pan-American Engineering Co., 820 Parker St., Berkeley, Calif.
Panelyte Div., St. Regis Paper Co., 230 Park Ave., New York 17, N. Y.
Pangborn Corp., Pangborn Blvd., Hagerstown, Md.
Paragon Electric Co., 37 W. Van Buren St., Chicago 5, Ill.
Paragon-Revolute Corp., 61 South Ave., Rochester 4, N. Y.
Paramount Products Co., 545 Fifth Ave., New York, N. Y.
Parker Appliance Co., The, 17325 Euclid Ave., Cleveland 12, O.
Parker-Kalon Corp., 200 Varick St., New York 14, N. Y.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Parks-Cramer Co., P.O. Box 444, Fitchburg, Mass.
Patent Novelty Co., 312 Eighth St., Fulton, Ill.

• Advertisement in this issue. See Index to Advertisers, pages 367-368.

Ind.; 2045 W. Hunting Park Ave., Philadelphia 40, Pa.
Lintern Co., Berea, O.
Lion Mfg. Corp., 2701-11 Belmont Ave., Chicago, Ill.
Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago 23, Ill.
Liquidometer Corp., 37-15 Skillman Ave., Long Island City 1, N. Y.
Lissberger & Son, Inc., Marks, 23-01 Borden Ave., Long Island City, N. Y.
Little Mfg. Co., M. S., 151 New Park Ave., Hartford 6, Conn.
Littleford Bros., 453 E. Pearl St., Cincinnati 2, O.
Locke Regulator Co., Walter and Osborne Sts., Salem, Mass.
Lockformer Co., The, 4615 Arthington St., Chicago, Ill.
Lockjoint Wood Products Co., 1721 Mildred St., Wichita 7, Kans.
Locknut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Logan Engineering Co., Lawrence & Lamon Ave., Chicago 30, Ill
Loline Steel Boiler Co., 235 Penn St., Allentown, Pa.
Lonergan Co., J. E., 2nd and Race Sts., Philadelphia 6, Pa.
Lonergan Mfg. Co., Albion, Mich.
Long Mfg., Div. Borg-Warner Corp., 12501 Dequindre St., Detroit, Mich.
Lookout Boiler & Mfg. Co., Compress St. & Mfrs. Rd., Chattanooga 1, Tenn.
Lord, Hawley & Hammell, 3145 N. Mascher St., Philadelphia 33, Pa.
• Lord Mfg. Co., 1633 W. 12th St., Erie, Pa.
Louisville Drying Machinery Co., 351 Baxter Ave., Louisville, Ky.
Lovejoy Flexible Coupling Co., 5024 W. Lake St., Chicago 44, Ill.
Lowell Air Conditioning Corp., Otis Bldg., Philadelphia, Pa.
Lowell Wrench Co., 54 Commercial St., Worcester 8, Mass.
Loyal Knight Stokers, Inc., 800 Scheel St., Belleville, Ill.
Ludlow Valve Mfg. Co., Inc., Foot of Adams St., Troy, N. Y.
Ludowici-Celadon Co., 104 S. Michigan Ave., Chicago, Ill.
Lukens Steel Co., 308 S. First Ave., Coatesville, Pa.
Lumm Co., A. H., 2512 Albion St., Toledo 6, O.
Lumsden & Van Stone Co., 426 First St., South Boston 27, Mass.
Lundy Co., E. A., 420 Lexington Ave., New York 17, N. Y.
Lunkenheimer Co., Waverly & Beekman Sts., Cincinnati 14, O.
Luzerne Rubber Co., Muirhead Ave., Trenton 9, N. J.
Lynch Mfg. Corp., Defiance, O.
Lynchburg Foundry Co., Peoples Bank Bldg., Lynchburg, Va.
Lyon, Conklin & Co., Inc., McComas & Race Sts., Baltimore 30, Md.

• M B Mfg. Co., Inc., The, 1060 State St., New Haven 11, Conn.
Maas & Waldstein Co., 438 Riverside Ave., Newark 4, N. J.
Macksons Co., 125 Cedar St., New York 6, N. Y.
MacLean-Fogg Lock Nut Co., 2653 N. Kildare, Chicago 39, Ill.
Magirl Foundry & Furnace Wks., P. H., 413 E. Oakland Ave., Bloomington, Ill.
Mahon Co., R. C., 8650 Mt. Elliott Ave., Detroit, Mich.
• Maid-O'-Mist, Inc., 3215 N. Pulaski Rd., Chicago 41, Ill.
Maintenance Engineering Corp., 3611 Clinton Dr., Houston, Tex.
Majestic Co., 733 Erie St., Huntington, Ind.
Major Controls Sales Div., 12 Norfolk St., Cambridge, Mass.
Majot Automatic Machine Co., Inc., 88 Main St., East Orange, N. J.
Mall Tool Co., 7740 S. South Chicago Ave., Chicago 19, Ill.
Malleable Iron Fittings Co., Branford, Conn.
Mallory Sales Co., 13904 Lincoln Ave., Dolton, Ill.
Manhattan Perforated Metal Co., Inc., 43-17 37th St., Long Island City 1, N. Y.
Manhattan Rubber Mfg., Div. of Raybestos-Manhattan, Inc., 61 Willett St., Passaic, N. J.
• Manheim Mfg. & Belting Co., Manheim, Pa.
Manitowoc Boiler Wks., 16th & The River, Manitowoc, Wis.
Mansfield & Green, 2601 Euclid Ave., Cleveland 3, O.
Manufacturers Fin Coil Co., 2505 S. Pulaski Rd., Chicago 23, Ill.
Manufacturers Machine Co., Railroad Ave., North Andover, Mass.
Maple Valley Mfg. Co., First St., Mapleton, Ia.
Maplewood Machinery Co., Inc., 2634 Fullerton Ave., Chicago 47, Ill.
Marathon Electric Mfg. Corp., Cherry and Randolph Sts., P. O. Box 298, Wausau, Wis.
Marble-Card Electric Co., Gladstone, Mich.
Marion Machine Foundry & Supply Co., Marion, Ind.
Marley Co., Inc., The, 3001 Fairfax Rd., Kansas City 15, Kans.
Marlin-Rockwell Corp., Jamestown, N. Y.
• Mario Coil Co., 6135 Manchester Ave., St. Louis 10, Mo.
Marquette Mfg. Co., 401 Johnson St., Minneapolis, Minn.
Marsh Corp., Jas. P., 2073 Southport Ave., Chicago 14, Ill.
Marsh Heating Equipment Co., 2120 Southport Ave., Chicago 14, Ill.
Marsh Valve Co., 4th St. & Brigham Rd., Dunkirk, N. Y.
Marshalltown Mfg. Co., 901 E. Nevada, Marshalltown, Ia.
Martens & Stormoen, 15 Hathaway St., Boston 10, Mass.
Martin, J. O. & C. U., 637 Minna St., San Francisco, Calif.
Martin Fan & Blower Co., 4634 W. 21st Pl., Chicago 50, Ill.
Martin & Sons, H. P., 801 W. 12th St., Owensboro, Ky.
• Martocello & Co., Jos. A., 229 N. 13th St., Philadelphia 7, Pa.
Mason-Neilan Regulator Co., 1190 Adams St., Boston 24, Mass.
Masonite Corp., 111 W. Washington St., Chicago 2, Ill.
Master Electric Co., 126 Davis Ave., Dayton 1, O.
Master Electric Co., Aircraft & Electrical Controls Div., 100 Davis Ave., Dayton 1, O.
Matthiessen & Hegeler Zinc Co., 9th & Sterling Sts., La Salle, Ill.
Maurath, Inc., 7309 Union Ave., Cleveland, O.
• Maurey Mfg. Corp., 2915 S. Wabash Ave., Chicago 16, Ill.
May Oil Burner Div., Gerotor May Corp., Maryland Ave. and Oliver, Baltimore 3, Md.
Mayflower Air-Conditioners, Inc., 5th Floor, Finch Ind. Bldg., St. Paul, Minn.
Mayne Products Co., 324 Harries Bldg., Dayton 2, O.
Mayson Mfg. Co., Inc., 4332 Horatio St., Detroit 10, Mich.
Maysteel Products, Inc., 135 W. Wells St., Milwaukee 3, Wis.
• McAlear Mfg. Co., 1901-1909 S. Western Ave., Chicago 8, Ill.
McAuley Trap Co., 405 Penn Ave., Pittsburgh 22, Pa.
McCann Furnace Co., 5005 Euclid Ave., Cleveland 3, O.
• McCord Corp., 2587 E. Grand Blvd., Detroit 11, Mich.
McCorkle Co., D. H., 6th & Bancroft Way, Berkeley 2, Calif.
McDeramid Chemical Co., Bristol, Conn.
• McDonnell & Miller, Inc., Wrigley Bldg., 400 N. Michigan Ave., Chicago 11, Ill.
• McIntyre Co., The, 15 Riverdale Ave., Newton 58, Mass.
McKay Co., York, Pa.
McLeod & Henry Co., Inc., Troy, N. Y.
McPherson Furnace & Supply Co., 1805 N. E. Second Ave., Portland 12, Ore.
• McQuay, Inc., 1600 Broadway, N. E., Minneapolis 13, Minn.
McQuay-Norris Mfg. Co., Southwest Ave. at Marconi, St. Louis 10, Mo.
McWane Cast Iron Pipe Co., 1201 Vanderbilt Rd., Birmingham 2, Ala.
Mears-Kane-Ofeldt, Inc., 1903-1915 E. Hagert St., Philadelphia 25, Pa.
Medart Co., 3500 DeKalb, St. Louis, Mo.
Meier Electric & Machine Co., 3525 E. Washington St., Indianapolis 7, Ind.
Mellish & Murray Co., 1715 Carroll Ave., Chicago 12, Ill.
Merchant & Evans Co., 2035 Washington Ave., Philadelphia 46, Pa.
• Mercoid Corp., The, 4201 Belmont Ave., Chicago 41, Ill.
Merco-Nordstrom Valve Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Mercury Clutch Corp., Canton 6, O.
Meriam Instrument Co., The, 10920 Madison Ave., Cleveland 2, O.
Mesker & Co., Geo. L., 400 N. W. First St., Evansville 8, Ind.
Metal & Thermit Corp., 120 Broadway, New York, N. Y.
Metallo Gasket Co., 16 Bethany St., New Brunswick, N. J.
Metropolitan Refining Co., Inc., 23-28 50th Ave., Long Island City, N. Y.
• Mettler Co., Lee B., 406 S. Main St., Los Angeles 13, Calif.
Meyer & Bro. Co., F., 1313 S. Adams St., Peoria 2, Ill.
Meyer Furnace Co., The, Peoria 2, Ill.
Meyer Mfg. Co., 2536 Fourteenth St., Detroit 16, Mich.
Michell Air Conditioning Co., Inc., 1725 State St., Schenectady, N. Y.
Michigan Pipe Co., 506 Phoenix Bldg., Bay City, Mich.
Micro Products Co., 20 N. Wacker Dr., Chicago 6, Ill.
Mirco Switch Div. of First Industrial Corp., 1 E. Spring St., Freeport, Ill.
Middleton Mfg. & Sales Co., 125 N. 1st St., Minneapolis 6, Minn.
Midland Paint & Varnish Co., 9115 Reno Ave., Cleveland, O.
Mid-States Equipment Co., 2429 S. Michigan Ave., Chicago 16, Ill.
• Midwest Piping & Supply Co., Inc., 1450 S. Second St., St. Louis 4, Mo.
Milcor Steel Co., S. 41st & Burnham Sts., Milwaukee 4, Wis.
Miller Electric Mfg. Co., Inc., 718 S. Bounds St., Appleton, Wis.
Miller Heat-O-Meter Co., 1434 W. Atkinson Ave., Milwaukee 6, Wis.
Millers Falls Co., 57 Wells St., Greenfield, Mass.
Mills Corp., Elmer E., 153-159 W. Huron St., Chicago 10, Ill.
Mills Industries, Inc., 4110 W. Fullerton Ave., Chicago, Ill.
Milwaukee Gas Specialty Co., 2025 W. Clybourn St., Milwaukee 7, Wis.
Milwaukee Valve Co., S. Burrell St. at E. Hayes Ave., Milwaukee, Wis.
Mineral Insulation Co., 103rd & Southwest Highway, Chicago Ridge, Ill.
• Minerallac Electric Co., 25 N. Peoria St., Chicago 7, Ill.
• Minneapolis-Honeywell Regulator Co., 2604 4th Ave., S., Minneapolis 8, Minn.
Minn-Kota Foundry & Mfg. Co., 201 Second St., N., Fargo, N. D.
Misener Mfg. Co., Inc., 326 E. Washington St., Syracuse 2, N. Y.
Mississippi Glass Co., 200 Fifth Ave., New York 10, N. Y.
Mir-O-Col Alloy Co., 2416 E. 53rd St., Los Angeles 11, Calif.
Moeller Instrument Co., 132nd St. & 89th Ave., Richmond Hill 18, N. Y.
Mitchell & Co., Inc., W. K., 29th & Ellsworth, Philadelphia, Pa.
Mitchell & Smith, Inc., 9507 Copeland Ave., Detroit 17, Mich.
Modern Engineering Co., 3411 Pine Blvd., St. Louis 3, Mo.
• Modine Mfg. Co., 1772 Racine St., Racine, Wis.
Moeller Instrument Co., 132nd St. & 89th Ave., Richmond Hill, N. Y.
Moeschl-Edwards Corrugating Co., Inc., The, P. O. Box 1115, Cincinnati 1, O.
Moloch Foundry & Machine Co., Kaukauna, Wis.
Monarch Mfg. Works, Inc., Salmon & Westmoreland Sts., Philadelphia 34, Pa.
Monash-Younker Co., 1315 W. Congress St., Chicago, Ill.
Moncrief Furnace Co., P. O. Box 1673, Atlanta 1, Ga.
Monitor Controller Co., The, 51 S. Gay St., Baltimore 2, Md.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Monsanto Chemical Co., Merimac Div., Everett, Mass.
Montag Stove & Furnace Wks., 2011 N. Columbia Blvd., Portland 3, Ore.
Montgomery Bros., 61 Fremont St., San Francisco, Calif.

Patrol Valve Co., The, 2310 E. Superior Ave., Cleveland 14, O.
Patten Co., J. V., 500 De Kalb Ave., Sycamore, Ill.
Patterson-Ballagh Corp., 1900 E. 65th St., Los Angeles, Calif.
• Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Payne Furnace & Supply Co., Inc., 336-338 N. Foothill Rd., Beverly Hills, Calif.
Peabody Engineering Corp., 580 Fifth Ave., New York 19, N. Y.
Pease Co., C. F., The, 2601 W. Irving Park Rd., Chicago, Ill.
Peck & Harvey, 4327 W. Addison St., Chicago 41, Ill.
Peck, Stow & Wilcox Co., Center St., Southington, Conn.
Pecora Paint Co., Inc., 4th St. and Penna. R. R., Philadelphia 40, Pa.
• Pedrick Tool & Machine Co., 3640 N. Lawrence St., Philadelphia 40, Pa.
• Peerless of America, Inc., 333 N. Michigan Ave., Chicago 1, Ill.
Peerless Electric Co., 3021 W. Market St., Warren, O.
• Peerless Mfg. Corp., 1400 W. Ormsby St., Louisville, Ky.
• Peerless Pump Div., Food Machinery Corp., 301 West Ave. 26, Los Angeles 31, Calif.
Peerless Unit Ventilation Co., Inc., 810 Union Ave., Bridgeport, Conn.
Penberthy Injector Co., 1242 Holden Ave., Detroit 2, Mich.
• Penn Electric Switch Co., P. O. Box 556, Goshen, Ind.
Penn Galvanizing Co., 2199 Tioga St., Philadelphia, Pa.
Penn Mfg. Corp. of Washington, Pa., 380 W. Chestnut St., P.O. Box 484, Washington, Pa.
Penn Ventilating Co., 3252 Goodman St., Philadelphia 40, Pa.
Pennsylvania Engineering Wks., 526 S. Jefferson St., New Castle, Pa.
Pennsylvania Flexible Metallic Tubing Co., 72nd St. and Powers Lane, Philadelphia 42, Pa.
Pennsylvania Forge Co., Milnor & Bleigh Sts., Philadelphia, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Pennsylvania Salt Mfg. Co., Widener Bldg., Philadelphia 7, Pa.
%Proportioneers, Inc. %, 9 Codding St., Providence 1, R. I.
Perfect Circle Co., The, Hagerstown, Ind.
Perfection Grate & Stoker Co., 4 Fisk Ave., Springfield 7, Mass.
Perfection Refrigeration Parts Co., Harvey, Ill.
Perfex Corp., 500 W. Oklahoma Ave., Milwaukee 7, Wis.
Perkins Machine Co., 4 Perkins Ave., Warren, Mass.
Perkins & Son, Inc., B. F., Chicopee St., Holyoke, Mass.
Permatex Co., Inc., 1716-1720 Avenue Y, Brooklyn 29, N. Y.
Permutit Co., 330 W. 42nd St., New York 18, N. Y.
Pernot & Rich, Inc., 2546 San Fernando Rd., Los Angeles 41, Calif.
Persson Co., T. G., 224 Glenwood Ave., Bloomfield, N. J.
Peters-Dalton, Inc., 17900 Ryan Rd., Detroit 12, Mich.
• Petroleum Heat & Power Co., Stamford, Conn.
Petrometer Corp., 1 Star Sq., Long Island City 1, N. Y.
Pfening Co., Fred D., The, 1075 W. 5th Ave., Columbus 8, O.
Phelps Dodge Copper Products Corp., British American Tube Div., 40 Wall St., New York 5, N. Y.
Phelps Mfg. Co., 801 Thomas St., Little Rock, Ark.
Philadelphia Gear Works, Inc., Erie Ave. & G St., Philadelphia 34, Pa.
Philadelphia Pipe Bending Co., 4135-65 N. Fifth St., Philadelphia 40, Pa.
Philadelphia Thermometer Co., 915 Filbert St., Philadelphia 40, Pa.
Philco Corp., Tioga and C Sts., Philadelphia 34, Pa.
• Phillips & Co., H. A., 3255 W. Carroll Ave., Chicago 24, Ill.
Phillips Cooling Tower Co., Inc., 114 Liberty St., New York 6, N. Y.
Phoenix Brass Fittings Corp., Coit St. & Chancellor Ave., Irvington 11, N. J.
Phoenix Ventilator Co., Inc., 1665 63rd St., Brooklyn, N. Y.
Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass.
Pick Mfg. Co., West Bend, Wis.
Pier Equipment Mfg. Co., 1440 Milton St., Benton Harbor, Mich.
Pierce Co., Wm. B., The, 133 S. Division, Buffalo 3, N. Y.
Piezo Mfg. Corp., 110 E. 42nd St., New York 17, N. Y.
Pilley Brush Co., Fort Madison, Ia.
Pines Engineering Co., Inc., 260 S. Highland Ave., Aurora, Ill.
Pioneer Roofing & Sheet Metal Co., 226 N. Main St., Muskogee, Okla.
Pipe Fabrication Institute, 1108 Clark Bldg., Pittsburgh, Pa.
Pipe & Tube Products, Inc., Empire State Bldg., New York 1, N. Y.
Pittsburgh Brass Mfg. Co., 3155 Penn Ave., Pittsburgh, Pa.
Pittsburgh Corning Corp., 632 Duquesne Way, Pittsburgh, Pa.
Pittsburgh Equitable Meter Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Pittsburgh Lectrodryer Corp., P.O. Box 1766, Pittsburgh 30, Pa.
Pittsburgh Pipe Coil & Bending Co., 61 Bridge St., Etna 23, Pa.
Pittsburgh Piping & Equipment Co., 43rd St. & A. V. R. R., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., 2000 Grant Bldg., Pittsburgh 19, Pa.
Pittsburgh Steel Co., Grant Bldg., Pittsburgh, Pa.
Pittsburgh Tube Co., Hagan Bldg., 323 Fourth Ave., Pittsburgh 22, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Pittsburgh Water Heater Corp., Box 4452, Pittsburgh 22, Pa.
Plant Rubber & Asbestos Works, 537 Brannan St., San Francisco 7, Calif.
Plastergon Wall Board Co., Philadelphia Ave., Buffalo 7, N. Y.
Plastic Products Co., 6475 Georgia Ave., Detroit 11, Mich.
Pleasantaire Corp., Tower Bldg., Washington 5, D. C.
Plibrico Jointless Firebrick Co., 1800 Kingsbury St., Chicago 14, Ill.
Plumb Mfg. Co., 1925 Dwyer Ave., Utica 3, N. Y.
Plummer Spray Equipment Co., 700 Filmore St., Napoleon, O.
Plymouth Industries, Inc., 1932 Harrison Ave., Plymouth, Ind.
Pocahontas Fuel Co., Inc., Stoker Div., 340 E. 131st St., Cleveland 8, O.
Poe Co., C. W., The, Mayfield at Lee, Cleveland 18, O.
Poole Foundry & Machine Co., 1700 Union Ave., Woodberry, Baltimore 11, Md.
• Porter & Co., Inc., H. W., 825 Frelinghuysen Ave., Newark 5, N. J.
Powell Co., Wm., The, 2525 Spring Grove Ave., Cincinnati 22, O.
• Power Engineering Co., 540 N. Michigan Ave., Chicago 11, Ill.
Power Piping Div., Blaw Knox Co., 829 Beaver Ave., Pittsburgh 12, Pa.
Powermatic Ventilator Co., 4019 Prospect Ave., Cleveland 3, O.
• Powers Regulator Co., 2759 Greenview Ave., Chicago, Ill.
Prat-Daniel Corp., Port Chester, N. Y.
Precision Control Co., 899 Bryant St., San Francisco, Calif.
Precision Scientific Co., 1750 N. Springfield Ave., Chicago, Ill.
Precision Thermometer & Instrument Co., 1434 Brandywine St., Philadelphia 30, Pa.
Preferred Utilities Mfg. Corp., 1860 Broadway, New York 23, N. Y.
Premier Furnace Co., Box 150, Dowagiac, Mich.
Presstite Engineering Co., 3900 Chouteau St., St. Louis 10, Mo.
• Pritchard & Co., J. F., Equipment Div., 2200 Fidelity Bldg., Kansas City 6, Mo.
Proctor & Schwartz, Inc., 7th St. and Tabor Rd., Philadelphia 20, Pa.
• Products Research Co., 634 S. Western Ave., Los Angeles 5, Calif.
Propellair, Inc., 1345 Lagonda Ave., Springfield, O.
Protected Steel Products Co., McAdams Ave., Washington, Pa.
Protective Coatings, Inc., P. O. Box 3985, Stratmoor Station, Detroit 27, Mich.
Prox Co., Inc., Frank, 1201 E. First St., Terre Haute, Ind.
Puhl & Hepper Mfg. Co., Inc., 6400 W. Florissant Ave., St. Louis 20, Mo.
Pure Carbonic, Inc., 60 E. 42nd St., New York 17, N. Y.
• Pyle-National Co., The, 1334 N. Kostner Ave., Chicago 51, Ill.
Pyott Foundry & Machine Co., 328 N. Sangamon St., Chicago, Ill.
Pyrolite Products Co., 1221-1231 W. 74th St., Cleveland 2, O.
Pyrometer Instrument Co., 103 Lafayette St., New York 13, N. Y.

Q-P Mfg. Co., Needham Heights, Mass.
Quaker City Iron Wks., Allegheny & Tulip Sts., Philadelphia 34, Pa.
Quaker Rubber Corp., Comly & Milnor Sts., Philadelphia 24, Pa.
Quickwork Div., Whiting Corp., Harvey, Ill.
Quiet Heet Mfg. Co., 135 New Jersey R. R. Ave., Newark 5, N. J.
Quigley Co., Inc., 527 Fifth Ave., New York 17, N. Y.
Quimby Pump Div., H. K. Porter Co., Inc., 340 Thomas St., Newark 5, N. J.

R-S Products Corp., Germantown Ave. at Wayne Junction Philadelphia 44, Pa.
R. U. V. Engineering Corp., South Norwalk, Conn.
Radiator Specialty Co., 1700-1900 Dowd Rd., Charlotte 1, N. C.
Rafter Machine Co., 259 Stephens St., Belleville, N. J.
Raisler Corp., Grimes Sprinkler Div., 129 Amsterdam Ave., New York 23, N. Y.
Ramsey Chain Co., Inc., 1029 Broadway, Albany 1, N. Y.
Ramtite Co., The, 2563 W. 18th St., Chicago 8, Ill.
Ranco, Inc., 601 W. 5th Ave., Columbus 1, O.
• Randall Graphite Products Corp., 609 W. Lake St., Chicago 6, Ill.
Ransome Machinery Co., Subsidiary of Worthington Pump & Machinery Corp., Dunellen, N. J.
Ravena Iron Co., Ravena, N. Y.
Rawlplug Co., Inc., The, 98 Lafayette St., New York 13, N. Y.
Ray Oil Burner Co., 401-499 Bernal Ave., San Francisco 12, Calif.
Rayfield Co., C. L., 2010-18 S. Halsted St., Chicago 8, Ill.
Raymond Pulverizer Div., Combustion Engineering Co., 1324 N. Branch St., Chicago, Ill.
• Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Red Jacket Mfg. Co., Davenport, Ia.
Red Spot Electric Co., 7405 S. Tacoma Way, Tacoma 9, Wash.
Redmond Co., Inc., Owosso, Mich.
Reed Unit-Fans, Inc., 1001 St. Charles Ave., New Orleans 8, La.
Reeves Pulley Co., 1000 N. Wilson St., Columbus, Ind.
Reeves Steel & Mfg. Co., Dover, O.
Refinite Corp., Refinite Bldg., Omaha 8, Neb.
Refractory & Insulation Corp., 120 Wall St., New York 5, N. Y.
Refrigeration Appliances, Inc., 917-923 W. Lake St., Chicago Ill.
Refrigeration Economics Co., Inc., 1231 Tuscarawas E., Canton 4, O.
Rega Mfg. Co., 79 Mt. Hope Ave., Rochester 7, N. Y.
Register & Grille Mfg. Co., Inc., 70 Berry St., Brooklyn, N. Y.
Reichert Float & Mfg. Co., 2238 Smead Ave., Toledo, O.
Reif-Rexoil, Inc., 37-41 Carroll St., Buffalo 3, N. Y.
Reilly Tar & Chemical Corp., 1615 Merchants Bank Bldg., Indianapolis 4, Ind.
Reiner & Campbell Co., Inc., 667 Norwood Terrace, Elizabeth 2, N. J.
Reliable Perforating Co., 2047 N. Wood St., Chicago, Ill.

Reliable Sheet Metal Engineering Co., 4334-50 S. Knox, Chicago, Ill.
Reliance Automatic Lighting Co., 1929 Mead St., Racine, Wis.
Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland 10, O.
Reliance Gauge Column Co., 5902 Carnegie Ave., Cleveland 3, O.
Reliance Refrigerating Machine Co., 3401 N. Kedzie Ave., Chicago, Ill.
Remco Products Corp., State and Hay Sts., York, Pa.
Rempe Co., 362 N. Sacramento Blvd., Chicago 12, Ill.
Rensselaer Valve Co., Ontario St., Cohoes, N. Y.
Reps Tool Co., Inc., 99 Wall St., New York 5, N. Y.
Republic Flow Meters Co., 2240 Diversey Pkwy., Chicago, Ill.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Ave., Cleveland 13, O.
Research Corp., Chrysler Bldg., New York 17, N. Y.
• Research Products Corp., 1015 E. Washington Ave., Madison 3, Wis.
Resisto Pipe & Valve Co., 262 Bridge St., East Cambridge, Mass.
Resistoflex Corp., Belleville 9, N. J.
• Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Rex Clay Products Co., 14414 Dexter Blvd., Detroit, Mich.
Rex Welder & Engineering Co., 7 E. 19th St., Kansas City 8, Mo.
Reynolds Electric Co., 2603 W. Congress St., Chicago 12, Ill.
Reynolds Mfg. Co., The, 412 Prospect St., N. E., Grand Rapids, Mich.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Reynolds Metals Co., Reynolds Metals Bldg., Richmond 19, Va.
Reznor Mfg. Co., Mercer, Pa.
Rheem Mfg. Co., 582 Market St., San Francisco, Calif.
• Rhoads & Sons, J. E., 35 N. Sixth St., Philadelphia 6, Pa.
Rhode Island Fittings Co., Hillsgrove, R. I.
Rhode Island Humidifier & Ventilating Co., 99 Chauncy St., Boston 11, Mass.
Rhodes, Inc., M. H., 30 Bartholomew Ave., Hartford, Conn.
Richmond Engineering Co., Inc., 7th and Hospital Sts., Richmond, Va.
Richmond Fireproof Door Co., Northwest F St., Richmond, Ind.
Richmond Radiator Co., Gas Products Div., Uniontown, Pa.
Ric-wiL Co., 1562 Union Commerce Bldg., Cleveland 14, O.
Riddle, Inc., W. A., E. 7th St., Frederick, Md.
• Ridge Tool Co., Clark St., Elyria, O.
Rid-Sludge Chemical Co., 1316 Third St., N., Minneapolis 11, Minn.
Riggin Metal Products, Inc., Box 267, Kankakee, Ill.
Rigid-Tex Corp., 658 Ohio St., Buffalo 3, N. Y.
Riley Stoker Corp., 9 Neponset St., Worcester, Mass.
Robbins & Myers, Inc., Lagonda Ave., Springfield, O.
Roberts-Gordon Appliance Corp., 137 Arthur St., Buffalo 7, N. Y.
Roberts Tube Works, 2500 Military Ave., Detroit 9, Mich.
Robertson Co., H. H., 2400 Farmers Bank Bldg., Pittsburgh 22, Pa.
Robinson Aviation, Inc., Teterboro Air Terminal, Teterboro, N. J.
Robinson Insulation Co., Great Falls, Mont.
Rochester Lead Works, Inc., 380 Exchange St., Rochester 8, N. Y.
Rochester Mfg. Co., Inc., 100 Rockwood St., Rochester 10, N. Y.
Rock Fleece Co., 115 Durango St., El Paso, Tex.
Rock Island Register Co., 2435 Fifth Ave., Rock Island, Ill.
Rockwood Mfg. Co., 1801-2001 English Ave., Indianapolis 6, Ind.
Rockwood Sprinkler Co., 38 Harlow St., Worcester 5, Mass.
Roessing Mfg. Co., 1616 Noble St., Sharpsburg Branch, Pittsburgh 15, Pa.
Rogers Diesel & Aircraft Corp., 1120 Leggett Ave., New York, N. Y.
Roller Bearing Co. of America, Whitehead Rd., Trenton 3, N. J.
Rolyan Metal Products, 2330 W. 58th St., Chicago 36, Ill.
Rome-Turney Radiator Co., Canal St., Rome, N. Y.
Roots-Connersville Blower Corp., 16th St. & Columbia Ave., Connersville, Ind.
Roper Corp., Geo. D., Blackhawk Park Ave., Rockford, Ill.
Rosebraugh Co., W. W., 680 S. 17th St., Salem, Ore.
Rosedale Foundry & Machine Co., Columbus & Preble Aves., N. S., Pittsburgh, Pa.
Ross Engineering Corp., J. O., 350 Madison Ave., New York 17, N. Y.
Ross Heater & Mfg. Co., Inc., 1407 West Ave., Buffalo 13, N. Y.
Ross Sprinkler Co., 34 Roberts St., Pasadena 3, Calif.
Ross Valve Mfg. Co., Inc., 6 Oakwood Ave., Troy, N. Y.
Rotary Mfg. Co., 5718 Long Beach Ave., Los Angeles, Calif.
Rotary Seal Co., 2020 N. Larrabee St., Chicago 14, Ill.
Roxalin Flexible Finishes, Inc., 800 Magnolia Ave., Elizabeth F, N. J.
Roy Pumps, Milton, 1371 E. Mermaid Ave., Philadelphia 18, Pa.
Royal Air Conditioning Equipment Co., 1024 Westminster Ave., Alhambra, Calif.
Royal Ventilator Co., 415 Locust St., Philadelphia 6, Pa.
Royersford Foundry & Machine Co., Inc., 102-132 Main St., Royersford, Pa.
Ruberoid Co., 500 Fifth Ave., New York, N. Y.
Ruby Chemical Co., 74 McDowell St., Columbus 8, O.
Ruehfel Co., Inc., George, 101 Menahan St., Brooklyn, N. Y.
Ruemelin Mfg. Co., 3860 N. Palmer St., Milwaukee 12, Wis.
Ruggles-Klingemann Mfg. Co., 4 Foster Ct., P. O. Box 550, Salem, Mass.
Ruppright, Siegfried, 299 S. Atlantic Blvd., Los Angeles 22, Calif.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Russell Co., F. C., The, 1836 Euclid Ave., Cleveland 15, O.
Russell Electric Co., 348 W. Huron St., Chicago 10, Ill.
Russell Mfg. Co., John M., Box 246, Naugatuck, Conn.
Ruthman Machinery Co., Cincinnati, O.
• Rutland Fire Clay Co., Curtis Ave., Rutland, Va.
Ruud Mfg. Co., 2934 Smallman St., Pittsburgh 1, Pa.
Ryniker Steel Products Co., 122-124 N. 25th St., Billings, Mont.

SKF Industries, Inc., Front St. & Erie Ave., Philadelphia 34, Pa.
St. Louis Tool Co., 6100 Prescott St., St. Louis 15, Mo.
St. Paul Corrugating Co., Wabasha and Water Sts., St. Paul 1, Minn.
Sac Tool Mfg. Co., 1913 Washington Ave., St. Louis 3, Mo.
Sales & Co., Murray W., 801 W. Baltimore Ave., Detroit 2, Mich.
Salina Metal Products Co., 9th and Bishop, Salina, Kans.
Sall Mountain Co., 176 W. Adams St., Chicago 3, Ill.
Salsbury Motors, Inc., 4464 District Blvd., Los Angeles 11, Calif.
Sampsel Time Control, Inc., Spring Valley, Ill.
Samson-United Corp., 1700 University Ave., Rochester, N. Y.
Sandberg Sheet Metal Works, 500 N. E. Union Ave., Portland, Ore.
Sandee Mfg. Co., 3945 N. Western Ave., Chicago 18, Ill.
Sangamo Electric Co., 1301 N. 11th St., Springfield, Ill.
Sanvin Chemical Products Co., 1617 21st Ave., Moline, Ill.
• Sarco Co., Inc., 475 Fifth Ave., New York 17, N. Y.
Sarcotherm Controls, Inc., 280 Madison Ave., New York 16, N. Y.
Sauereisen Cements Co., Sharpsburg Station, Pittsburgh 15, Pa.
Saunders Machine & Tool Corp., 25 Atherton St., Yonkers, N. Y.
Saverite Engineering Co., 1031 Clinton St., Hoboken, N. J.
Sawyer Electrical Mfg. Co., 5701 Smithway, Los Angeles, Calif.
Scaife Co., 26 Ann St., Oakmont, Pa.
Scanlan-Morris Co., Madison 4, Wis.
Schade Valve Mfg. Co., 2527 N. Bodine St., Philadelphia 33, Pa.
Schaible Co., The, Cincinnati 4, O.
Schatz Mfg. Co., The, Fairview, Poughkeepsie, N. Y.
• Schaub Engineering Co., Fred H., 325 W. Huron St., Chicago 10, Ill.
Schecter Brothers Co., Hancock and Huntingdon Sts., Philadelphia 33, Pa.
Schelm Bros., Inc., 1737 Howard St., East Peoria, Ill.
Schieren Co., Chas. A., 30-38 Ferry St., New York 7, N. Y.
Schmieg Industries, 312-320 Piquette Ave., Detroit 2, Mich.
Schneible Co., Claude B., 2827 25th St., Detroit 16, Mich.
Schoedinger, F. O., 322-358 Mt. Vernon Ave., Columbus 16, O.
Schramm, Inc., West Chester, Pa.
Schubert-Christy Corp., Box No. 725, Indio, Calif.
Schundler & Co., Inc., F. E., 45-15 Vernon Blvd., Long Island City, N. Y.
Schutte & Koerting Co., 12th and Thompson Sts., Philadelphia, Pa.
Schwitzer-Cummins Co., 1125 Massachusetts Ave., Indianapolis 7, Ind.
Sciaky Bros., 4915 W. 67th St., Chicago 38, Ill.
Scientiae Tool Co., 400 Linden Ave., Dayton 3, O.
Scientific Instrument Co., 531-535 W. Larned, Detroit 26, Mich.
Scott-Newcomb, Inc., 1922 Pine St., St. Louis, Mo.
Scott Valve Mfg. Co., 3963 McKinley Ave., Detroit 8, Mich.
Sealed Power Corp., 500 Sanford St., Muskegon 61, Mich.
Sealkote Corp., 400 N. Sangamon St., Chicago, Ill.
Seamlex Co., Inc., 27-27 Jackson Ave., Long Island City, N. Y.
Selas Corp. of America, Erie Ave. and D St., Philadelphia 34, Pa.
Sellers Engineering Co., 4860 N. Clark St., Chicago 40, Ill.
Semco Mfg. Co., 118-122 Third Ave., N., Nashville, Tenn.
Semet-Solvay Engineering Corp., 40 Rector St., New York 6, N. Y.
Semler Co., Jeannette, Pa.
Semon Bache & Co., Greenwich & Morton Sts., New York 14, N. Y.
Servel, Inc., Electric Refrigeration Div., 119 Morton Ave., Evansville 20, Ind.
Service To Industry, Box 133, West Hartford, Conn.
Service Machine Co., 158 Miller St., Elizabeth 4, N. J.
Shafer Bearing Corp., 1412 W. Washington, Chicago, Ill.
Shallcross Co., 48th and Grays Ferry Rd., Philadelphia 2, Pa.
Shallcross Controls, Inc., 121 N. Broadway, Milwaukee, Wis.
Shank Co., Cyrus, 625 W. Jackson Blvd., Chicago 6, Ill.
Sharon Steel Corp., Sharon, Pa.
Shaw Co., Benjamin F., Second & Lombard Sts., Wilmington 99, Del.
Shaw-Kendall Engineering Co., 120-130 S. Superior St., Toledo 4, O.
Shaw-Perkins Mfg. Co., Oliver Bldg., Pittsburgh 22, Pa.
Sheetlock Co., 4521 N. Clark St., Chicago 40, Ill.
Sheet Metal Mfg. Co., Inc., 953 Myrtle Ave., Brooklyn, N. Y.
Sheffler-Gross Co., Drexel Bldg., Philadelphia 6, Pa.
Sherwin-Williams Co., The, 101 Prospect Ave., N.W., Cleveland, O.
Shreveport Engineering Co., Inc., 1553-55 Texas Ave., Shreveport, La.
Sight Feed Generator Co., 14-18 N. 10th St., Richmond, Ind.
Signal Electric Mfg. Co., Menominee, Mich.
Signal Indicator Co., 140 Cedar St., New York, N. Y.
Silvercote Products, Inc., 161 E. Erie St., Chicago 11, Ill.

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Simplex Heating Specialty Co., Inc., 1105 Church St., Lynchburg, Va.
Simplex Mfg. Co., 198 N. Main St., Fond du Lac, Wis.
Simplex Oil Heating Corp., 11 Park Pl., New York 7, N. Y.
Sims Co., 18th & Whitley Sts., Erie, Pa.
Sinker-Davis Co., 230 S. Missouri St., Indianapolis 4, Ind.
Sioux Steel Co., P. O. Box 898, Sioux Falls, S. D.
Sipe & Co., James B., Box 8010 S. Hills Branch, Pittsburgh, Pa.
Skidmore Corp., St. Joseph, Mich.
Skilbeck Mfg. Co., 7432 27th Ave., Kenosha, Wis.
Skilsaw, Inc., 5033 Elston Ave., Chicago 30, Ill.
Skinner Co., M. B., South Bend, Ind.
Skinner Engine Co., 337 W. 12th St., Erie, Pa.
• Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., 1948 N. 9th St., St. Louis 6, Mo.
Skinner Irrigation Co., 1212 E. Canal St., Troy, O.
Skuttle Mfg. Co., 517 E. Larned St., Detroit 26, Mich.
Slater Mfg. Co., 24 Water St., Wakefield, Mass.
Sly Mfg. Co., W. W., 4700 Train Ave., Cleveland 2, O.
Small Motors, Inc., 1322 Elston Ave., Chicago 22, Ill.
• Smith Co., Inc., H. B., The, 57 Main, Westfield, Mass.
Smith, Inc., James Campbell, 1679 Collamer Rd., Cleveland, O.
Smith, Inc., Winfield, H., 144 Eaton St., Springville, Erie County, N. Y.
Smith & Kanzler Corp., 516-534 Lidgerwood Ave., Elizabeth 2, N. J.
Smith Mfg. Co., Inc., F. A., P.O. Box 509, Rochester 2, N. Y.
Smith-Raymond Co., 1231-33 Tenth Ave., Columbus, Ga.
Smith Twin Tubular Boiler Co., Inc., Cottman St., at State Rd., Philadelphia 35, Pa.
Smith Welding Equipment Corp., 2633 S.E. Fourth St., Minneapolis 14, Minn.
Smolensky Valve Co., Inc., 940 Broadway, Bedford, O.
Smooth-On Mfg. Co., 568-574 Communipaw Ave., Jersey City 4, N. J.
Snap-On Tools Corp., Kenosha, Wis.
Socony Paint Products, Div. of Socony-Vacuum Oil Co., Inc., 111 Broadway, New York 6, N. Y.
• Sola Electric Co., 2525 Clybourn Ave., Chicago 14, Ill.
Solar Aircraft Co., San Diego, Calif.
Solvay Sales Corp., 42 Rector St., New York, N. Y.
Somers, Inc., H. J., 6063 Wabash Ave., Detroit 8, Mich.
Somerville Iron Wks., Somerville, N. J.
Sonneborn Sons, Inc., L., 88 Lexington Ave., New York 16, N. Y.
Sonner Burner Co., 412-420 E. 6th Ave., Winfield, Kans.
• South Bend Air Products Corp., 304 E. Colfax Ave., South Bend 22, Ind.
South Chester Tube Co., Front & Thurlow Sts., P.O. Box 60, Chester, Pa.
Southbridge Roofing Co., Inc., Hartwell and Chapin Sts., Southbridge, Mass.
Souther Iron Co., E. E., 1952 Kienlen Ave., St. Louis 20, Mo.
Southern States Iron Roofing Co., Stiles Ave., Savannah, Ga.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
• Spang-Chalfant, Div. of National Supply Co., Grant Bldg., Pittsburgh 30, Pa.
Special Chemicals Co., 30 Irving Pl., New York 3, N. Y.
Specialty Converters, Inc., East Braintree, Mass.
Speedway Mfg. Co., 1834 S. 52nd Ave., Chicago (Cicero), Ill.
Spence Engineering Co., Inc., 32 Grant St., Walden, N. Y.
Spencer Heater Div., The Aviation Corp., 164 Park St., Williamsport, Pa.
Spencer Thermostat Co., 34 Forest St., Attleboro, Mass.
Spencer Turbine Co., 486 New Park Ave., Hartford 6, Conn.
Sponge Rubber Products Co., Shelton, Conn.
• Sporlan Valve Co., 3723 Commonwealth St., St. Louis 17, Mo.
Spray Engineering Co., 114 Central St., Somerville 45, Mass.
• Spraying Systems Co., 4031 W. Lake St., Chicago 24, Ill.
Sprayo-Flake Co., 2715 Irving Park Blvd., Chicago 18, Ill.
Sprout-Waldron & Co., Muncy, Pa.
Square D Co., 6060 Rivard St., Detroit 11, Mich.
Square D Co., Industrial Controller Div., 4041 N. Richards St., Milwaukee 12, Wis.
Squires Co., C. E., The, E. 40th St. & Kelley Ave., Cleveland 3, O.
Standard Asbestos Mfg. Co., 820-822 W. Lake St., Chicago 7, Ill.
Standard Engineering Wks., 289 Roosevelt Ave., Pawtucket, R. I.
Standard Fuel Engineering Co., 667 Post Ave., S., Detroit 17, Mich.
Standard Furnace & Supply Co., 413-17 S. Tenth St., Omaha 8, Neb.
Standard Galvanizing Co., 2619 W. Van Buren St., Chicago, Ill.
Standard Heater & Oil Equipment Co., 245 Cornelison Ave., Jersey City 2, N. J.
Standard Lime & Stone Co., 2004 First National Bank Bldg., Baltimore, Md.
Standard Pressed Steel Co., Jenkintown, Pa.
Standard Reseater Corp., 423 W. 126th St., New York 27, N. Y.
Standard Rolling Mills, Inc., 143 Jewel St., Brooklyn 22, N. Y.
• Standard Stamping & Perforating Co., 3151 W. 49th Pl., Chicago 32, Ill.
Standard Thermometer, Inc., 65 Shirley St., Boston 19, Mass.
Standard Transmission Equipment Co., 3407 Verdugo Rd., Los Angeles 41, Calif.
Standard Tube Co., 14600 Woodward Ave., Highland Park 3, Mich.
Standard Ventilator Co., Lewisburg, Pa.
Stanley Electric Tools, Div. of The Stanley Works, Elm St., New Britain, Conn.
Staples & Pfeiffer, 528 Bryant St., San Francisco 7, Calif.
Star Electric Motor Co., 197 Grove St., Bloomfield, N. J.
Star Expansion Bolt Co., 147 Cedar St., New York 6, N. Y.
Star Mfg. Co., Inc., 530 Kinsley Ave., Providence, R. I.
Star Products Co., 130 Walnut Ave., New York 54, N. Y.
Starr Piano Co., Richmond, Ind.
Steamaire Co., Cincinnati 2, O.
Steel City Electric Co., 1201 Columbus Ave., Pittsburgh, Pa.
Steel Improvement & Forge Co., 974 E. 64th St., Cleveland 14, O.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.
Steel and Tubes Div., Republic Steel Corp., 224 E. 131st St., Cleveland 8, O.
Steinhorst & Sons, Inc., Emil, 612 South St., Utica 3, N. Y.
• Stephens-Adamson Mfg. Co., 47 Ridgeway Ave., Aurora, Ill.
Sterling Electric Motors, Inc., 5401 Anaheim Telegraph Rd., Los Angeles 22, Calif.
Sterling Engineering & Mfg. Corp., 114 Business St., Hyde Park 36, Mass.
• Sterling, Inc., 3738 N. Holton St., Milwaukee 12, Wis.
Stewart Ice Machine Co., 1046 E. 22nd St., Los Angeles, Calif.
Stewart Mfg. Co., 610 Bloomfield Ave., Bloomfield, N. J.
Stewart-Rogers, Inc., 3915 Powelton Ave., Philadelphia 4, Pa.
Stewart-Warner Corp., 1826-1852 Diversey Parkway, Chicago 14, Ill.
Stickle Steam Specialties Co., 2215 Valley Ave., Indianapolis 1, Ind.
Stockham Pipe Fittings Co., 4100 Tenth Ave., N., Birmingham 2, Ala.
Stok-A-Fire Co., 6504 Olive Street Road, University City 5, Mo.
Stokermatic Div., Rheem Mfg. Co., 1415 S. State St., Salt Lake City 4, Utah.
Stokes Machine Co., F. J., 5910 Tabor Rd., Philadelphia 20, Pa.
Stokes Rubber Co., Jos., Taylor & Webster, Trenton 4, N. J.
Stout & Sons, David, 3943 Cleveland Ave., St. Louis 10, Mo.
Stow Mfg. Co., 445 State St., Binghamton, N. Y.
Straight Line Foundry & Machine Corp., Direct Separator Div., The, 218 S. Geddes St., Syracuse 4, N. Y.
Strandwitz & Co., Inc., W. J., Jefferson and Master Sts., Camden, N. J.
Strong, Carlisle & Hammond Company, 1392 W. Third St., Cleveland 13, O.
Struthers Dunn, Inc., 1321 Arch St., Philadelphia, Pa.
Struthers Wells Corp., Titusville, Pa.
Stuart Co., W. W., 417 Ninth St., Des Moines 9, Iowa.
Sturtevant Co., B. F., Div. of Westinghouse Electric Corp., Damon St., Hyde Park, Boston 36, Mass.
Sturtevant Co., P. A., Addison, Ill.
Sudbury Laboratory, South Sudbury, Mass.
Sullivan Machinery Co., Michigan City, Ind.
Sullivan Valve & Engineering Co., 910 S. Arizona St., Butte, Mont.
Sundstrand Machine Tool Co., Pump Div., 2531 11th St., Rockford, Ill.
Sun-Fire Stoker Corp., New Albany, Ind.
Super Mold Corp., 402 N. Sacramento St., Lodi, Calif.
Super Radiator Corp., 652 Stinson Blvd., Minneapolis 13, Minn.
Superior Railway Products Corp., 7501 Thomas Blvd., Pittsburgh, Pa.
Superior Sheet Steel Co., The, Division of Continental Steel Corp., Canton-Louisville Rd., Canton, O.
Superior Steel Corp., Grant Bldg., Pittsburgh 19, Pa.
Superior Valve and Fittings Co., 1509 W. Liberty Ave., Pittsburgh 26, Pa.
Superstat Co., 38 Walter St., Springfield, Mass.
Supreme Air Filter Co., 126 W. 21st St., New York, N. Y.
Supreme Electric Products Corp., 194 Vassar St., Rochester 7, N. Y.
• Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Sutton Corp., O. A., Beacon Bldg., Wichita 2, Kan.
Swaby Mfg. Co., 2330 W. Cermak Rd., Chicago 8, Ill.
Swaine Mfg. Co., Fred J., 1300 N. Seventh St., St. Louis 6, Mo.
• Swan Engineering Co., Inc., 28-58 Nelson St., Bloomfield, N. J.
Swartwout Co., 18511 Euclid Ave., Cleveland 12, O.
Swendeman, Inc., 171 Camden St., Boston, Mass.
Swift Mfg. Co., 247 McDougall Ave., Detroit 7, Mich.
• Syncromatic Corp., 5110 N. 35th St., Milwaukee, Wis.
Synchro-Start Products, 221 E. Cullerton St., Chicago 16, Ill.
Syntron Co., Homer City, Pa.

Taber Pump Co., 272 Elm St., Buffalo 3, N. Y.
Taco Heaters, Inc., 342 Madison Ave., New York, N. Y.
Tagliabue Div., C. J., Portable Products Corp., Park & Nostrand Aves., Brooklyn 5, N. Y.
Tallmadge & Co., Webster, 364 Glenwood Ave., East Orange, N. J.
Tal's Prestal Bender, Inc., 225 N. Water St., Milwaukee 2, Wis.
Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.
Tampa Shipbuilding Co., Pump and Tank Div., Tampa 1, Fla.
• Taylor Forge & Pipe Wks., P. O. Box 485, Chicago 90, Ill.
Taylor-Hall Welding Corp., Box 311, Warren, O.
• Taylor Instrument Companies, 95 Ames St., Rochester 1, N. Y.
Taylor Sons Co., Charles, 715 Burns St., Cincinnati 14, O.
Taylor-Winfield Corp., 1052 Mahoning Ave., N. W., Warren, O.
Technical Ply-Woods, 228 N. LaSalle St., Chicago 1, Ill.
Techtmann Industries, Inc., 828 N. Broadway, Milwaukee, Wis.
Tecumseh Products Co., Tecumseh, Mich.
Telsit Insulation Co., 1933 West Farms Rd., Bronx 60, N. Y.
• Templeton Bros., Inc., 699 Main St., Walpole, Mass.
Templeton Mfg. Co., 114 Business St., Hyde Park 36, Mass.

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Temprite Products Corp., 47 Piquette Ave., Detroit 2, Mich.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Tennessee Products Corp., American National Bank Bldg., Nashville, Tenn.
• Tenney Engineering, Inc., 26 Avenue B, Newark 5, N. J.
Terre Haute Boiler Works Co., 1140 Crawford, Terre Haute, Ind.
Terry Steam Turbine Co., The, P. O. Box 1200, Hartford 1, Conn.
Textite Corp., 2110 Roscoe St., Chicago 18, Ill.
Thatcher Furnace Co., Centre St., Garwood, N. J.
Thermac Co., 800 E. 108th St., Los Angeles, Calif.
Thermal Co., Inc., 1434 N. Fourth St., Milwaukee, Wis.
Thermal Engineering Co., 2967 S. LaSalle St., Chicago 16, Ill.
Thermal Industries, Box No. 725, Indio, Calif.
Thermal Syndicate, Ltd., The, 12 E. 46th St., New York, N. Y.
Therminsul Corp., 1603 Fulford St., Kalamazoo, Mich.
Thermix Engineering Co., First National Bank Bldg., Greenwich, Conn.
Thermoid Rubber, Div. of Thermoid Co., Whitehead Rd., Trenton 6, N. J.
Thomas Co., Arthur H., W. Washington Square, Philadelphia, Pa.
Thompson & Co., Box 6757, Pittsburgh, Pa.
Thomson-Gibb Electric Welding Co., 161 Pleasant St., Lynn, Mass.
• Thrush & Co., H. A., Peru, Ind.
Thwing-Albert Instrument Co., Penn and Pulaski Sts., Philadelphia, Pa.
Tierney Rotor Ventilator Co., 239 Fourth Ave., S., Minneapolis, Minn.
Tiffin Eaves Trough Clamp Co., 25 Miami, Tiffin, O.
Timken Roller Bearing Co., 1835 Dueber Ave., S. W., Canton 6, O.
Timken Roller Bearing Co., Steel and Tube Div., Canton 6, O.
• Tinnerman Products, Inc., 2018 Fulton Rd., Cleveland 13, O.
Tippett & Wood, Morris and Warren Sts., Phillipsburg, N. J.
Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.
• Titusville Iron Wks. Co., S. Franklin St., Titusville, Pa.
• Todd Shipyards Corp., Combustion Equipment Div., 601 W. 26th St., New York 1, N. Y.
Toledo Pipe Threading Machine Co., 1445 Summit St., Toledo 4, O.
Torchweld Equipment Div., National Cylinder Gas Co., 4700 W. 19th St., Chicago 50, Ill.
Torit Mfg. Co., 292 Walnut St., St. Paul 2, Minn.
Tork Clock Co., Inc., 1 Grove St., Mt. Vernon, N. Y.
Torrington Mfg. Co., 70 Franklin St., Torrington, Conn.
Trade-Wind Motorfans, Inc., 5725 S. Main St., Los Angeles 37, Calif.
Trageser Copper Wks., Inc., 5000 Grand Ave., Maspeth, Long Island, N. Y.
• Trane Co., The, La Crosse, Wis.
Trent Co., Harold E., Leverington Ave. and Wilde St., Philadelphia, 27, Pa.
Trent Tube Mfg. Co., East Troy, Wis.
Trerice Co., H. O., 1420 W. Lafayette Blvd., Detroit 16, Mich.
Triangle Mfg. Co., 396 Division St., Oshkosh, Wis.
Trimont Mfg. Co., 55-71 Amory St., Roxbury, Boston 19, Mass.
Trimount Instrument Co., 37 W. Van Buren St., Chicago 5, Ill.
Trimount Rotary Power Co., 398 Whiting Ave., P. O. Box 65, East Dedham, Mass.
Trindl Products, Ltd., 17 E. 23rd St., Chicago 16, Ill.
Triplex Heating Specialty Co., 252 N. Grant, Peru, Ind.
Tropical Paint & Oil Co., 1244-86 W. 70th St., Cleveland, O.
Troy Engine & Machine Co., Troy, Pa.
Trufio Fan Co., 523 Main St., Harmony, Pa.
Tru-Line Corp., 1725 Clover Field Blvd., Santa Monica, Calif.
Trumbull Electric Mfg. Co., The, Woodford Ave., Plainville, Conn.
Truscon Laboratories, Caniff and Grand Trunk R. R., Detroit 11, Mich.
Truscon Steel Co., 1315 Albert St., Youngstown 1, O.
Tryco Products, Inc., Railroad Sq., Westfield, Mass.
• Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.
Tubing Appliance Co., 3881 Victoria Ave., Los Angeles 43, Calif.
Tubing Seal-Cap, Inc., 215 W. 7th St., Los Angeles, Calif.
• Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif.
Turner Brass Wks., The, 821-47 Park Ave., Sycamore, Ill.
Tutnill Pump Co., 939 E. 95th St., Chicago 19, Ill.
• Tuttle & Bailey, Inc., Corbin Ave., New Britain, Conn.
XXth Century Heating & Ventilating Co., 96 Ira Ave., Akron 1, O.

U. S. Electrical Motors, Inc., 200 E. Slauson Ave., Los Angeles 54, Calif.
U. S. Electrical Tool Co., 1050 Findlay St., Cincinnati 14, O.
U. S. Expansion Bolt Co., P. O. Box 827, State St. & P. R. R., York, Pa.
U. S. Gutta Percha Paint Co., 43 Dudley St., Providence 1, R. I.
U. S. Machine Corp., Lebanon, Ind.
U. S. Pipe & Mfg. Co., 249 First St., San Francisco 5, Calif.
USHCO Mfg. Co., Inc., 135 Tonawanda St., Buffalo 7, N. Y.
Uehling Instrument Co., 473 Getty Ave., Paterson 3, N. J.
Una Welding, Inc., 1615 Collamer Ave., E., Cleveland 10, O.
Underground Steam Construction Co., 73 Pitts St., Boston 14, Mass.
Unified Air Conditioner Co., Torry Bldg., Duluth, Minn.
Uniflow Mfg. Co., E. Lake Rd., Erie, Pa.
Union Asbestos & Rubber Co., 54th Ave. and 18th St., Cicero 50, Ill.
Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N. Y.
Union Iron Wks., 1500 Cascade St., Erie, Pa.
Union Metal Wks., 128 Carter St., Chelsea 50, Mass.
Union Steam Pump Co., Capitol Ave., S. W., Battle Creek, Mich.
Union Water Meter Co., 333 Hermon St., Worcester, Mass.
United Appliance Co., Rochester 10, N. Y.
United Chromium, Inc., 51 E. 42nd St., New York 17, N. Y.
United Cinephone Corp., Torrington, Conn.
United Cork Companies, Central Ave., Kearny, N. J.
United Electric Controls Co., 69-71 A St., Boston 27, Mass.
United Metal Hose Co., Inc., 36-01 43rd Ave., Long Island City 1, N. Y.
• United States Air Conditioning Corp., 2101 Kennedy St., N. E., Minneapolis 13, Minn.
United States Brass & Copper Co., Hyde Park, Boston, Mass.
United States Gasket Co., 1518 Pierce Ave., Camden, N. J.
United States Gauge Co., Sellersville, Pa.
United States Gypsum Co., 300 W. Adams St., Chicago 6, Ill.
United States Mineral Wool Co., 10 S. La Salle St., Chicago 3, Ill.
United States Ozone Co. of America, Crescent St., Scottdale, Pa.
United States Pipe & Foundry Co., Burlington, N. J.
United States Radiator Corp., 1500 United Artists Bldg., Detroit 31, Mich.
United States Register Co., Burnham St., Battle Creek, Mich.
United States Rubber Co., 1230 Sixth Ave., New York 20, N. Y.
United States Steel Corp., 436 Seventh Ave., Pittsburgh, Pa.
United States Steel Supply Co., 1319 W. Wabansia, Chicago, Ill.
United States Stoneware Co., 60 E. 42nd St., New York 17, N. Y.
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Universal Air Filter Corp., 332 W. Michigan St., Duluth 2, Minn.
Universal Cooler, Div. of International Detrola Corp., 259 Joseph St., Marion, O.
Universal-Cyclops Steel Corp., Bridgeville, Pa.
Universal Gypsum & Lime Co., 111 W. Washington St., Chicago, Ill.
Universal Motor Co., 323 Universal Ave., Oshkosh, Wis.
Universal Power Corp., 731 Carnegie Ave., Cleveland 15, O.
Universal Zonolite Insulation Co., 135 S. LaSalle St., Chicago 3, Ill.
Uno Ventilator Co., 565 Lincoln Ave., Cliftondale, Mass.
Utica Products, Inc., Utica 4, N. Y.
Utica Radiator Corp., 2201 Dwyer Ave., Utica 2, N. Y.
Utility Appliance Corp., 4851 S. Alameda St., Los Angeles 11, Calif.
Utility Laboratory, Inc., 230 36th St., Brooklyn 32, N. Y.

Vanderman Mfg. Co., Mansfield Ave., Willimantic, Conn.
Van Dorn Electric Tool Co., Towson, Md.
Van Noorden Co., E., 100 Magazine St., Boston 19, Mass.
Vapor Car Heating Co., Inc., 80 E. Jackson Blvd., Chicago 4, Ill.
Vapor Specialty Co., 101 W. 42nd St., New York 18, N. Y.
Ventilating Products Co., 2800 Cottage Grove Ave., Chicago, Ill.
Verson Allsteel Press Co., 93rd & Kenwood Ave., Chicago 19, Ill.
Vesco Corp., 1381 Sedgwick Ave., New York 52, N. Y.
Vibration Eliminator Co., 10-28 47th Ave., Long Island City 1, N. Y.
Vibration Control Co., 545 Fifth Ave., New York, N. Y.
Victaulic Co. of America, 30 Rockefeller Plaza, New York 20, N. Y.
Victor Electric Products, Inc., 2950 Robertson Rd., Cincinnati 9, O.
Victor Equipment Co., 844 Folsom St., San Francisco 7, Calif.
Viking Air Conditioning Corp., 5600 Walworth Ave., Cleveland 2, O.
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Viking Shear Co., 1063 W. 19th St., Erie, Pa.
Vilter Mfg. Co., The, 2148 S. First St., Milwaukee 7, Wis.
Vinco Co., Inc., The, 305 E. 45th St., New York 17, N. Y.
Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Virginia Smelting Co., West Norfolk, Va.
Vita-Screen Ventilator Co., 103 Park Ave., New York, N. Y.
Vogt Machine Co., Henry, 1000 W. Ormsby St., Louisville 10, Ky.
Voss Co., J. H. H., 785 E. 144th St., Corner of Wales Ave., New York 54, N. Y.
Vulcan Electric Co., 88-90 Holten St., Danvers, Mass.
• Vulcan Radiator Co., 26 Francis Ave., Hartford 6, Conn.

Wade Mfg. Co., Elgin, Ill.
• Wagner Electric Corp., 6400 Plymouth Ave., St. Louis 14, Mo.
Wales Dove-Hermiston Corp., Westfield, N. J.
Waldron Corp., John, New Brunswick, N. J.
Walker Jamar Co., 367 S. First Ave., E., Duluth, Minn.
Wall Chemicals Div. of The Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago 23, Ill.

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Walsh Refractories Corp., 4070 N. First St., St. Louis 7, Mo.
• Walworth Co., 60 E. 42nd St., New York 17, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Ward Leonard Electric Co., 37 South St., Mt. Vernon, N. Y.
Warlo Corp., 330 W. 42nd St., New York 18, N. Y.
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Warren Foundry & Pipe Corp., 11 Broadway, New York 4, N. Y.
Warren Steam Pump Co., Inc., 300 Bridges Ave., Warren, Mass.
• Warren Webster & Co., 17th and Federal Sts., Camden, N. J.
Washburne & Co., E. G., 207 Fulton St., New York, N. Y.
Washington Steel Corp., Washington, Pa.
Water Cooling Corp., 71 Nassau St., New York 7, N. Y.
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Water Refining Co., 1123 Barthold, Ft. Wayne, Ind.
Water Service Laboratories, Inc., 423 W. 126th St., New York 27, N. Y.
Water Treatment Company of America, 1159 Hodgkiss St., Pittsburgh 12, Pa.
Waterfilm Boilers, Inc., 154 Ogden Ave., Jersey City 7, N. J.
• Waterloo Register Div. of Associated Manufacturers, Inc., Jefferson & W. Mullan St., Waterloo, Iowa.
Watson & McDaniel Co., 440 N. Marshall, Philadelphia 23, Pa.
• Watson-Stillman Co., 140 Aldene Rd., Roselle, N. J.
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Watts Regulator Co., 10 Embankment St., Lawrence, Mass.
Waukesha Motor Co., Waukesha, Wis.
Waverly Heating Supply Co., 31 Union St., Boston 8, Mass.
Way Loctor Access Panel Co., 420 Boylston St., Boston 16, Mass.
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Webster Electric Co., S. W. Corner Clark & De Koven Aves., Racine, Wis.
• Webster Engineering Co., 419 W. Second St., Tulsa 1, Okla.
Webster Tallmadge & Co., 364 Glenwood Ave., East Orange, N. J.
Wedge Protectors, Inc., 9522 Richmond Ave., Cleveland 5, O.
Weil-McLain Co., 641 W. Lake St., Chicago 6, Ill.
Well Pump Co., 1528 N. Fremont St., Chicago 22, Ill.
Weinman Pump Mfg. Co., The, 290 W. Spruce St., Columbus 8, O.
• Weirton Steel Co., Weirton, W. Va.
Weiss & Co., H., 113-115 Mercer St., New York, N. Y.
Weksler Thermometer Corp., 52-56 W. Houston St., New York 12, N. Y.
Weldex, Inc., 7326 McDonald Ave., Detroit, Mich.
Welding Apparatus Co., 2750 W. Van Buren St., Chicago, Ill.
• West Coast Electric Mfg. Co., 1008 S. Main St., Los Angeles 3, Calif.
Western Blower Co., 1800 Airport Way, Seattle 4, Wash.
Western Brass Mill Div., Olin Industries, Inc., East Alton, Ill.
Western Chemical Co., 713 Washington St., Kansas City 6, Mo.
Western Engineering & Mfg. Co., 1726 E. Washington Blvd., Los Angeles 21, Calif.
Western Felt Wks., 4029-4117 Ogden Ave., Chicago 23, Ill.
Western Furnaces, Inc., 950 Commerce St., Tacoma 2, Wash.
Western Hanger Co., 55 New Montgomery St., San Francisco, Calif.
Western Mineral Products Co., 2602 Ed Creighton Ave., Omaha 1, Nebr.
Western Piping & Engineering Co., 119 Kansas St., San Francisco 3, Calif.
Western Precipitation Corp., 1016 W. 9th St., Los Angeles, Calif.
Western Silicair Products, Inc., 72 W. Alameda Ave., Burbank, Calif.
• Western Thermal Equipment Co., 1701 W. Slauson Ave., Los Angeles 44, Calif.
Western Wire & Iron Works, Inc., 957 W. 18th Pl., Chicago 8, Ill.
Western Wire Products Co., 1415-25 S. 18th St., St. Louis 4, Mo.
Westfalia Separator Co., 30 Orange St., Bloomfield, N. J.
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Westinghouse Electric Corp., 653 Page Blvd., Springfield, Mass.
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Westinghouse Electric Corp., Heating Section, Meadville, Pa.
Westinghouse Electric Corp., X-Ray Div., 2519 Wilkens Ave., Baltimore, Md.
Weston Electrical Instrument Corp., 619 Frelinghuysen Ave., Newark 5, N. J.
500 Fifth Ave., New York 18, N. Y.
• Wheatland Tube Co., 606-608 Real Estate Trust Bldg., Philadelphia 7, Pa.
Wheelco Instruments Co., Harrison and Peoria Sts., Chicago 7, Ill.
• Wheeler, Inc., W. H., 7 E. 47th St., New York 17, N. Y.
Wheeler Mfg. Co., C. H., 19th, Lehigh & Sedgley Ave., Philadelphia 32, Pa.
Wheeling Machine Products Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling Steel Corp. Bldg., Wheeling, W. Va.
White Flo-Matic Corp., 1 Mechanic St., Hoosick Falls, N. Y.
White Mfg. Co., 2362 University Ave., St. Paul, Minn.
• White-Rodgers Electric Co., 1209 Cass Ave., St. Louis 6, Mo.
Whiting Corp., Harvey, Ill.
Whiting Stoker Sales Co., 11 S. La Salle St., Chicago 3, Ill.
Whitlock Mfg. Co., 100 South St., Hartford 1, Conn.
Whitney Chain & Mfg. Co., The, 237 Hamilton St., Hartford 2, Conn.
Whitney Mfg. Co., W. A., 636 Race St., Rockford, Ill.
Whitney Metal Tool Co., 110 Forbes St., Rockford, Ill.
Whittington Pump & Engineering Co., 245 S. Meridan St., Indianapolis 4, Ind.
Whitty Co., Inc., 86 Western Ave., Boston 34, Mass.
Wickes Boiler Co., 502 N. Water St., Saginaw, Mich.
Wickes Bros., 500 N. Tilden St., Saginaw, Mich.
Wickwire Spencer Steel, Div. of Colorado Fuel & Iron Corp., 500 Fifth Ave., New York 18, N. Y.
Wiedeman Machine Co., 1815 Sedgley Ave., Philadelphia 32, Pa.
• Wiegand Co., Edwin L., 7610 Thomas Blvd., Pittsburgh 8, Pa.
Wiggins Oil Tool Co., Inc., E. B., 3424 E. Olympic Blvd., Los Angeles 23, Calif.
Wilbur & Williams Co., 1036 Park Square Bldg., Boston 16, Mass.
Wilcolator Co., 1001 Newark Ave., Elizabeth 8, N. J.
Wilhelm Co., A., 3rd and Bern Sts., Reading, Pa.
Will Corp., 35 Russell St., Rochester 3, N. Y.
Will-Burt Co., The, Orrville, O.
Williams & Co., J. H., Buffalo 7, N. Y.
Williams Gauge Co., 1620 Pennsylvania Ave., N. S., Pittsburgh 12, Pa.
Williams, Inc., F. C., 6661 Chase Rd., Dearborn, Mich.
Williams Oil-O-Matic Heating Corp., 1201 East Bell, Bloomington, Ill.
Williams & Son, I. B., Dover, N. H.
Williams Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati 25, O.
Williamson Heater Co., 4558 Marburg Ave., Cincinnati 19, O.
Williamsport Engine & Machine Co., 1306 Memorial Ave., Williamsport, Pa.
Willis Steel Corp., 156 N. Academy St., Galesburg, Ill.
Willson Products, Inc., 348 Thorn St., Reading, Pa.
Wiji-Weld Mfg. Co., Inc., 600-620 S. 15th St., Omaha 2, Nebr.
Willy's Carbide Tool Co., 1340 W. Vernor Highway, Detroit, Mich.
Wilson & Co., 4100 S. Ashland Ave., Chicago, Ill.
Wilson Co., H. A., The, 105 Chestnut St., Newark, N. J.
Wilson Co., K. R., 215 Main St., Buffalo, N. Y.
• Wilson, Inc., Grant, 141 W. Jackson Blvd., Chicago 4, Ill.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York, N. Y.
Wind-Way Fan & Ventilator Co., 527 St. Joseph St., New Orleans 13, La.
• Wing Mfg. Co., L. J., 14th St. & 7th Ave., New York 11, N. Y.
Winkler & Sons, Inc., A. E., 2337 N. 31st St., Milwaukee 10, Wis.
Winslow Engineering Co., 4069 Hollis, Oakland, Calif.
Wipe-On Corp., 105 Hudson St., New York, N. Y.
Wiremold Co., The, Hartford 10, Conn.
Wiss & Sons Co., J., 33 Littleton Ave., Newark 7, N. J.
Witte Engine Works, Div. of Oil Well Supply Co., 1600 Oakland St., Kansas City 3, Mo.
Wittenmeier Machinery Co., 850-860 N. Spaulding Ave., Chicago 51, Ill.
Wodack Electric Tool Corp., 4627 W. Huron St., Chicago 44, Ill.
Wolfe-Kote Co., 705 Center Ave., Sheboygan, Wis.
Wolff & Munier, Inc., 222 E. 41st St., New York 17, N. Y.
Wolverine Tube, Div. of Calumet and Hecla Consolidated Copper Co., 1411 Central Ave., Detroit 9, Mich.
Wood Conversion Co., 1981 First National Bank Bldg., St. Paul 1, Minn.
Wood Steel Co., Alan, Conshohocken, Pa.
Wood's Sons Co., T. B., 1275 Fifth Ave., Chambersburg, Pa.
Worner Electronic Devices, 609 W. Lake St., Chicago 6, Ill.
Worthington Pump & Machinery Corp., Harrison, N. J.
• Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
Worthington-Gamon Meter Co., Harrison, N. J.
Wright-Austin Co., 315 W. Woodbridge St., Detroit 26, Mich.
Wyckoff & Son Co., A., 100 Home St., Elmira, N. Y.
• X Laboratories, Inc., 25 W. 45th St., New York 19, N. Y.
X L Refrigerating Co., 1834 W. 59th St., Chicago 36, Ill.
X-Pando Corp., 43-15 36th St., Long Island City 1, N. Y.

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Yale & Towne Mfg. Co., Stamford, Conn.
Yardley Plastics Co., 138 Parsons Ave., Columbus 15, O.
Yardley Industries, 138 Parsons Ave., Columbus 15, O.
• Yarnall-Waring Co., 107 Mermaid Ave., Philadelphia 18, Pa.
Yates-American Machine Co., Beloit, Wis.
Yeomans Bros. Co., 1433 N. Dayton St., Chicago 22, Ill.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.
York Corrugating Co., Adams St. & W. M. R. R., York, Pa.
York Corp., Roosevelt Ave., York, Pa.
York Electric & Machine Co., 30-34 N. Penn St., York, Pa.
York-Heat Div., York-Shipley, Inc., P. R. R. & Jessop Pl., York, Pa.
• York-Shipley, Inc., Industrial Div., York, Pa.
Yost Mfg. Co., Meadville, Pa.
Young & Bertke Co., 1004-1014 Hulbert Ave., Cincinnati 14, O.
• Young Radiator Co., 709 S. Marquette St., Racine, Wis.
Young Regulator Co., 5209 Euclid Ave., Cleveland 3, O.
• Youngstown Sheet & Tube Co., Stambaugh Bldg., Youngstown 1, O.
Zallea Brothers & Johnson, Taylor and Locust St., Wilmington 99, Del.
Zapon Div., Atlas Powder Co., North Chicago, Ill.
Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark 5, N. J.
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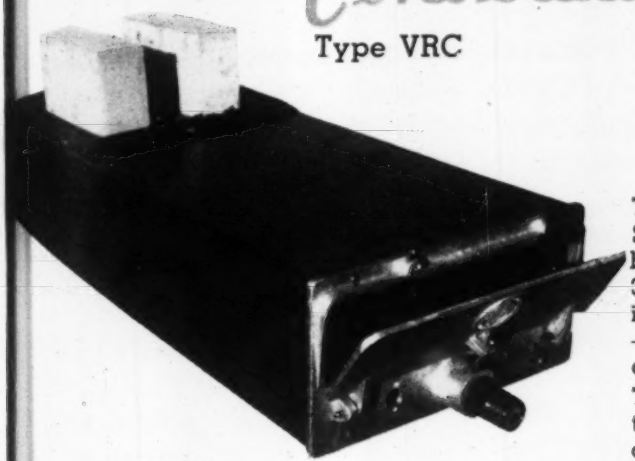
One Stop Burner Service

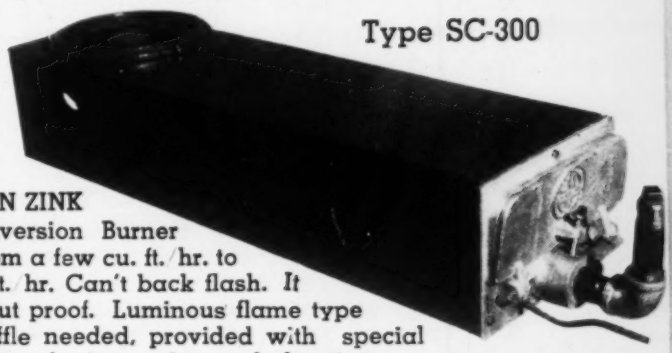
JOHN ZINK BURNERS

Conversion Burners

Type VRC



Type SC-300

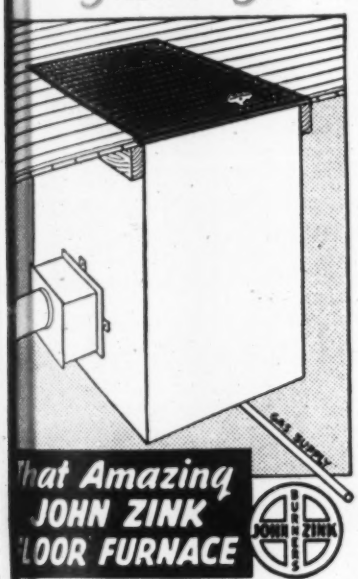


The JOHN ZINK SC Conversion Burner burns from a few cu. ft./hr. to 300 cu. ft./hr. Can't back flash. It is blowout proof. Luminous flame type —no baffle needed, provided with special access door for inspection and cleaning.

The JOHN ZINK VRC Conversion Burner has the same features as the SC. It is Blue Flame type. Two sizes 150 and 300 cu. ft. hr capacities.

THESE BURNERS WILL FIT 98% of all domestic furnaces.

Floor Furnaces



That Amazing JOHN ZINK FLOOR FURNACE

FEATURES—One large gas port, eliminates burner stoppage. Large full length combustion chamber giving uniform warm air temperature without overheat. Proper design makes possible a light air hood which is easily removed for cleaning the furnace. The gas burner is a pre-mix type, made of high grade cast iron, equipped with a pilot light. Automatic controls are available.

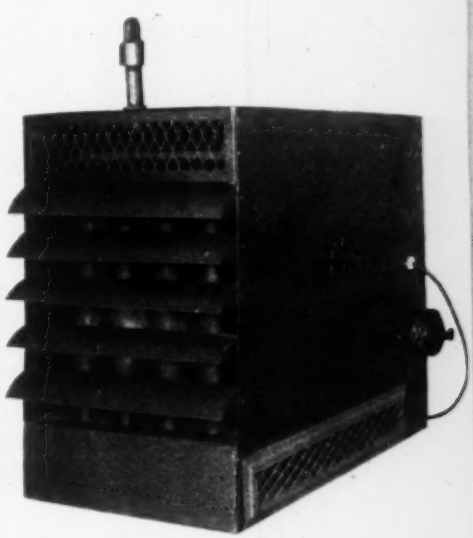
SIZES: No. 25 input rating 25,000 B.t.u./hr. No. 30 input rating 30,000 B.t.u./hr. No. 35 input rating 35,000 B.t.u./hr. No. 50 input rating 50,000 B.t.u./hr. No. 70 input rating 68,000 B.t.u./hr. Reasonably priced.

Unit Heaters

Long life cast iron burner of John Zink's own design and manufacture. Compact design. 100,000 B.t.u./hr. capacity. Equipped complete with built-in controls, including thermostat. Forced circulation provided by a recognized heavy duty electric motor and quiet running fan.

Piping and control equipment are simple and easy to install, and readily accessible. Require little wall room or head way can be suspended from roof trusses.

These new unit heaters are particularly adapted to heating and ventilating large or small spaces in industrial and commercial buildings.



We also manufacture Gas Burners, Oil Burners, and Combination Oil and Gas Burners for: Domestic Boilers, Heating Boilers, Industrial Boilers and Power Boilers. We are willing and capable of designing and manufacturing special burners for special purposes.

JOHN ZINK COMPANY

TULSA, OKLAHOMA

HOUSTON, TEXAS

NEW YORK, N. Y.

DETROIT, MICH.